American Artisan

THE WARM AIR HEATING AND SHEET METAL JOURNAL

FOUNDED 1880

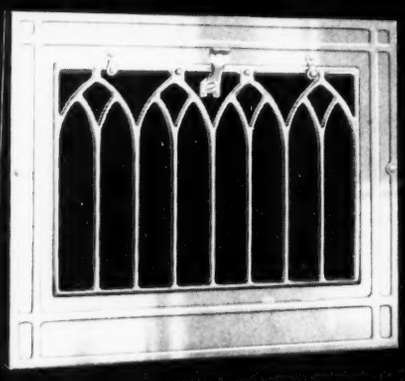
This imposing copper tower provides the main architectural feature of one of the handsomest churches in Cleveland. The copper work entailed one of the most unusual architectural sheet metal jobs of recent months. Details are in this issue.

JANUARY 5, 1931

This Year

Make Your Registers Play an Important Role In Making Furnace Sales

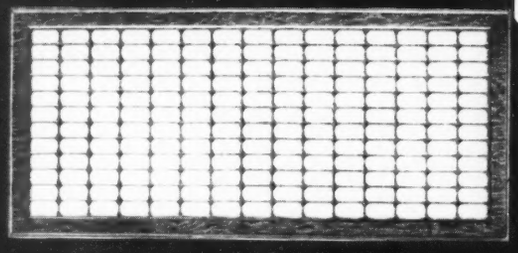
LITERALLY scores of furnace dealers have found that it pays like "four-of-a-kind" to show the H & C registers they propose for a job to the prospect and to point out their distinct superiority. The beauty of their design and finish immediately captures interest. Their sound construction, the careful, finished workmanship displayed in them, their greater air capacity, and the careful manner in which they are individually protected until installed, are all factors that create a quality atmosphere for the entire job. And, as a result, if old man competition comes along he usually finds plenty of sales resistance to overcome. Frequently it's just the trick that puts the sale across.



The new No. 110 series is meeting with tremendous favor everywhere. In common with all H & C Registers this series has exceptional air capacity. Size 8 x 12 is thoroughly adequate for a 10-inch pipe.

H & C Registers can help you a lot in making furnace sales. Why not decide now to standardize on them immediately? They cost no more than other makes.

H&C



No. 255, the original special cold air face, is still vastly superior to all others, as you will readily note by comparison. Stocked in Oak Grain as well as Black Japan and Oxidized Copper.

Most Jobbers Carry the Line

HART & COOLEY MFG. CO.

CHICAGO—61 West Kinzie St.
PHILADELPHIA, 1600 Arch St.
NEW YORK, 101 Park Ave.

NEW BRITAIN, CONN.—Corbin Ave.
BOSTON, 75 Portland St.
NASHUA, New Hampshire

Factories at Holland, Mich.—New Britain, Conn.—Nashua, N. H.

Also a Complete Line of *Furnace Regulators, Chain, Pulleys, Dampers and the H & C Automatic Heat Control*

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Published Every Other Week by Porter, Spofford, Langtry Corp., 139 North Clark Street, Chicago, Illinois. AMERICAN ARTISAN—the Warm Air Heating and Sheet Metal Journal—entered as second class matter, January 29, 1930, at the Post Office at Chicago, Illinois, under the act of March 3, 1879. Formerly entered on June 25, 1887, as American Artisan and Hardware Record.

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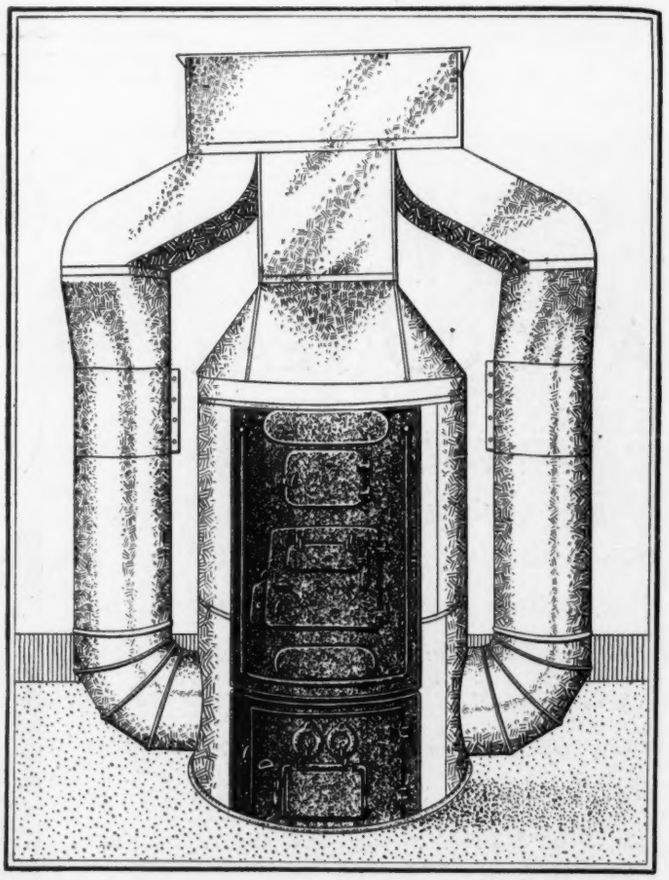

Meyer Furnace and Supply Co. say:

"We save 50% in time and labor *on many furnace and duct assemblies"*

AFTER fifteen years spent in making good warm air furnaces for the Kansas City territory, The Meyers Furnace and Supply Company should know the best way to assemble and set up such a heating system.

Take a tip from their experience in assembling sheet metal for such a job. Meyers say: "Hardened Self-tapping Sheet Metal Screws are used for every possible sheet metal assembly, including casing, ducts, transition pieces, elbows and extensions. It is so easy to use Sheet Metal Screws that savings of time and labor run as high as 50% on many assemblies. The fastenings do not loosen. And assemblies so made can be easily dismantled for repair or shipment."

The workman using Hardened Self-tapping Sheet Metal Screws makes the fastenings from the outside. He simply turns the Screws into holes which are drilled, punched or pierced in the metal sections. No other method of joining sheet metal and making fastenings to sheet metal up to 10 gauge thickness is so simple, speedy and economical.

Try Sheet Metal Screws on your own work. See why thousands of workmen are using them for all kinds of sheet metal jobs. Mail the coupon below to obtain free samples for trial.

PARKER-KALON
HARDENED SELF-TAPPING
Sheet Metal Screws

PATENTED — APR. 1, 1919 — No. 1299232 — MAR 28, 1922 — No. 1411184
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Hardened SCREWNAILS

For securely fastening sheet metal to wood. Drives easier. Holds 4 times better than ordinary nails.

Hardened MASONRY NAILS

For making fastenings to brick, mortar, concrete, etc. Hammer them in—no easier, cheaper way.

TRY THEM FREE

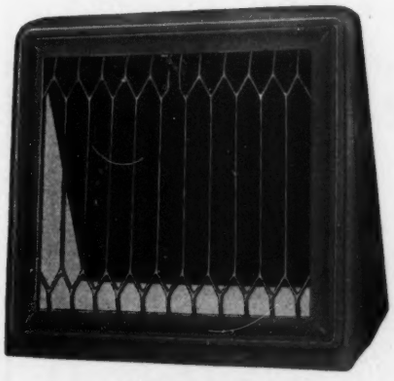
Parker-Kalon Corporation, 190 Varick Street, New York, N. Y.

I want to try free samples of the products I have checked. ☐ Hardened Self-tapping Sheet Metal Screws. ☐ Hardened Screwnails. ☐ Hardened Masonry Nails.

Name .....

Address .....

EVERYONE TO HIS OWN CHOICE



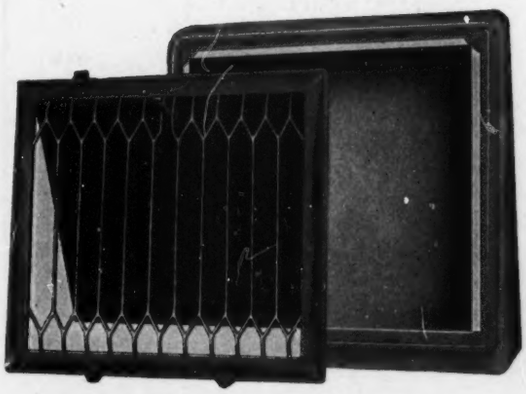
The PANAMA

The real reason for the invention and introduction of the PANAMA LINE of Baseboard and Convex Registers and Baseboard Cold Air Faces.

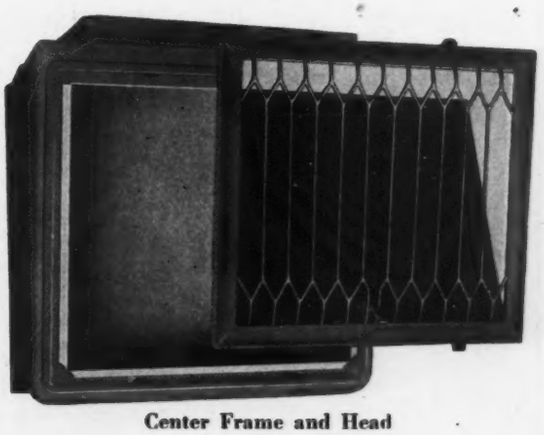
A bar design of positive beauty that is rich in appearance—that has put the beauty in and the ugliness out of Bar Design Registers.

SO—if you must prefer a Bar-Type Register order samples of the PANAMA LINE before you buy for 1931.

PANAMA Baseboard Registers—two-piece—with removable center. Made purposely for leak-proof connection between register and box.



Center Removed



Center Frame and Head

But—Still in the Ring and Going Stronger Than Ever

The JONES NATIONAL and the NATIONAL

A design of the beautiful pleasing style of the NATIONAL that has weathered the business storms of fifteen long years. Never changed but constantly improved to its present perfection.

Let a beautiful line of registers increase your furnace sales and profits for 1931.

You take no chance in placing a trial order—if any chance is taken we do that for you.

Get Our Last Catalog, No. 21

UNITED STATES REGISTER COMPANY

Battle Creek, Michigan

Branches—Minneapolis, Minn., Kansas City, Mo., Albany, N. Y., Denver, Colo., San Francisco, Calif., Los Angeles, Calif.

Say you saw it in AMERICAN ARTISAN—Thank you!

Founded 1880

American Artisan

THE WARM AIR HEATING AND SHEET METAL JOURNAL

Published Every Other Saturday

Covering All Activities
IN
Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Industrial Roofing
Merchandising
Ventilating

YEARLY SUBSCRIPTION PRICE:

United States	$2.00
Canada	$3.00
Foreign	$4.00
Single Copies	25c

VOL. 100, NO. 1

JANUARY 5, 1931

The story on page 12 is one of the nicest articles on making advertising pay we have run across in a long time. Most communities have or plan to have a model home. This story tells how one of our fellow contractors capitalized on this advertising and put across his own story.

• • •

If you don't read any of the other articles, read the one by Benjamin F. John. This is the beginning of a series on how to make money. And that is certainly one thing we are all interested in. This article takes up estimating, that bug-a-boo of shopping-around.

• • •

On page 32 begins a special section in which we plan to give readers practical ideas which have made money for other contractors. This is going to be open to any reader who has an idea to contribute. Tell us about some plan you have worked out, or some unit you make which brings in money.

Contents

139 North Clark Street, Chicago— Telephone Central 7670

FRED D. PORTER, *President* **JOHN C. LANGTRY,** *Vice-President* **HOWARD H. BEDE,** *Secretary*
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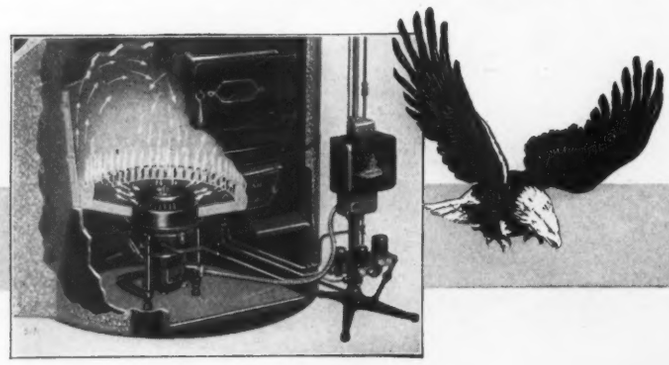
New York Office: 295 Madison Avenue, Room 1109, ***Tel. Ashland 5342*—L. R. Hudson,** ***Eastern Representative***

AGAIN SILENT AUTOMATIC LEADS



1930 . . . Another Year of Outstanding Success . . .

"Our position of world-leadership was maintained . . . and *strengthened* . . . largely by the unusual sales record established in 1930 by our *successful dealer organization*. Many new dealers were added during 1930 . . . and we swing into 1931 in a *stronger position* than ever before in our history."

Walter F. Tant
President, Silent Automatic Corporation

In Production, Sales and Installations

Through the untiring effort of its dealers, Silent Automatic *won* world-leadership in 1929 . . . and *held* this position, even in 1930. For *two successive years,* "Silent" has been *first* . . . in production, sales and installations.

To the Silent Automatic dealers whose splendid cooperation and outstanding sales records have made this leadership possible, we desire to express our sincere appreciation . . . and pledge ourselves to do everything within our power to increase the success of every dealer during 1931.

For Warm Air, Steam and Hot Water Heating Systems— Old or New Homes

SILENT AUTOMATIC CORPORATION
12001 East Jefferson Avenue Detroit, Michigan

SILENT AUTOMATIC
THE NOISELESS OIL BURNER
(375-A)

Made by the World's Largest Producer of Domestic Oil Burners

American Artisan
THE WARM AIR HEATING AND SHEET METAL JOURNAL

Vol. 100 CHICAGO, JANUARY 5, 1931 No. 1

Bring the Young Men to the Conventions

AS 1930 rolls out and the new year enters, the warm air heating and sheet metal industries again face a list of conventions staged by our state associations. It is to be hoped that the attendance at these conventions will be better than last year.

There is one thing, however, which should be done. That is to interest the younger contractors in our industries. Most state organizations have a group of older heads and on these men rests much of the success and drive of the associations. Nothing could be better than that these same seasoned generals should continue to guide the work of the associations.

Nevertheless, every association some of these days is going to need new blood. Any industry which is determined to advance must continually draw upon the coming generation for enthusiasm, energy and optimism. Our industries must do the same thing.

It is well to ask ourselves, then, are our programs designed to interest and hold this coming generation? Or are the associations going to rehash all the problems and decisions of past years without giving a place to the things the younger men are interested in?

There can be no denying that these younger men are not much concerned with the old arguments which have been stirring up conventions for twenty years past. To them there is only one thing of interest and that is to find in their chosen work enough profit to make effort worth while and enough interest to keep them satisfied that they have chosen an industry which holds bright possibilities for the future.

Their problems are going to be problems radically different from those our industries have and now face. In most instances they are going to be business men rather than mechanics. Their problems are going to be those of organization, selling, engineering, designing and making money. Of course both industries have always been up against these very same things, but in the past most contractors took refuge in being good mechanics and let the business end of their trade ride as it could.

That policy can't be followed in the future.

Although it is a little early as yet to know just what is going to be presented at the coming conventions, it is to be hoped that the needs of the younger men will be considered in building up the programs. It is not difficult to find those who can and will discuss problems of business as well as problems of mechanics and controversy. Such should be built into the programs.

And there is another thing the associations must do. That is to see that the younger men are brought to the meetings. Every older member should make it a point to bring at least one younger man from his community to the convention. And if possible this younger man should not be the son, but one of the younger contractors of the community.

We should remember that these younger men often fear to come because they feel that the older members are closely tied together through years of acquaintanceship and that they are in reality outsiders.

That feeling should not be permitted to exist.

The younger men should be made a part of the committee work of every organization. They should be encouraged to stand up and speak their minds. They should be given a chance to help supply the driving force so necessary to the life and continuation of our organizations.

We Thank You!

It certainly was nice of you readers to compliment us on the annual number of December 20. So many letters were received that we are taking this means of thanking all of you publicly. It may be egotism, but we thought that issue contained a wealth of ideas and practical suggestions. If any one of the stories appealed to you particularly, or if you have had experiences parallel to those published in the annual, we certainly would like to hear about it. We hope to make every issue of the new year as good as the annual.

A happy and prosperous New Year!

Copper—The Dominent Feature of this Cleveland Church

THERE stands on one of the most beautiful sites in Cleveland a church which illustrates strikingly the adaptability of copper craftsmanship to a difficult and unusual architectural design.

This edifice, the Epworth-Euclid M. E. Church, occupies a site above and adjacent to a small lake. The structure stands alone without adjoining buildings. This position governed to a large degree the design of the building, particularly the towering spire which tops the axis of the wings.

This large spire has an unusual shape. The base rests on a cut-cornered rectangular tower of masonry. The base of the tower is eight sided, with an area almost as great as the area of the masonry tower below. From the masonry the copper tower is carried straight up 9 feet. From this point a steep slope is incorporated for a distance of just over 26 feet terminating in a buttressed fleche with a belfrey, louvres and ornate moulding belts.

Topping the 55-foot copper fleche is a spike and crown finial, also of copper.

In addition to this interesting tower there are four main copper roofs on the wings.

Because of the unusualness of the design of the building and also because of the distinctive appearance of the copper spire, this church building has been one of the most discussed structures in Cleveland. Architects and builders have examined it carefully while the sheet metal contractors have pointed to it as a good example of how metal can be used to carry out even the most difficult of architectural motifs.

All of the copper work on the church was designed in detail and erected by the Riester and Thesmacher Company of Cleveland. Most of the contractors in the sheet metal industry know George Thesmacher.

The illustration with this article and the drawings show the general design and problems of the sheet metal contract. There are, however, several points about the design and the erection which warrant looking into more closely.

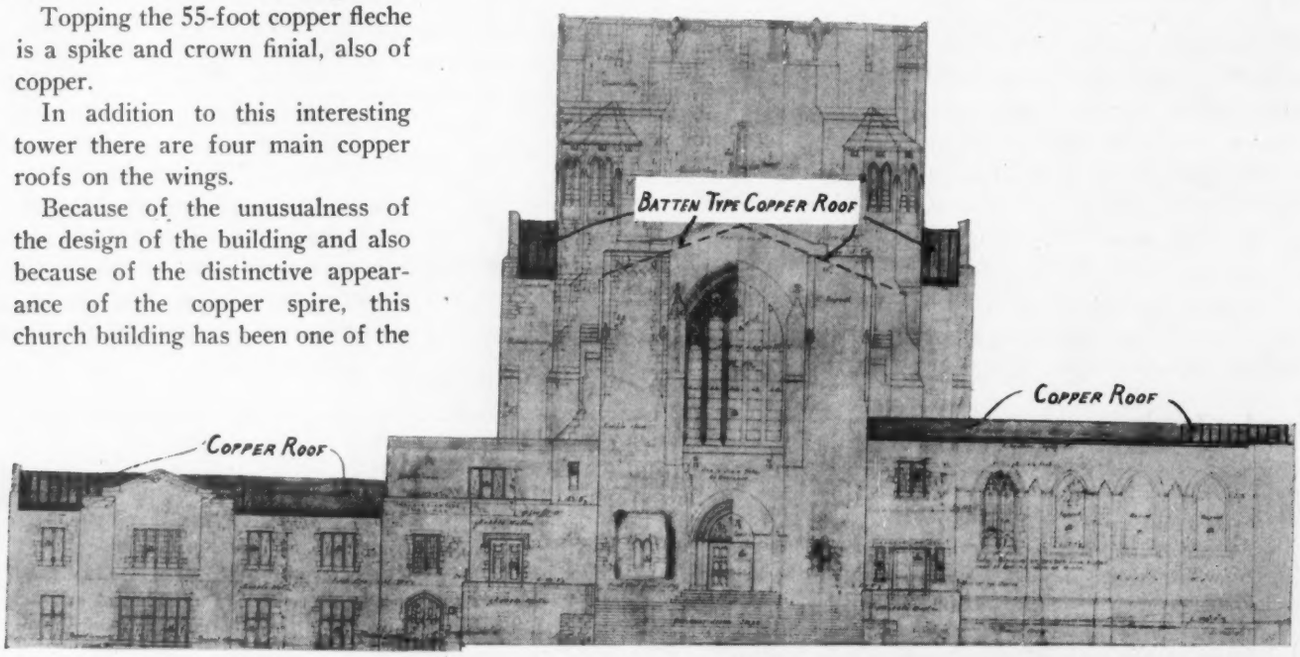
The spire is eight sided with heavy corners formed of battens with separate caps. The structure of this spire is a steel frame covered with a 2-inch plank sheathing. The copper sheets were cut long and are comparatively narrow. Only one sheet between battens was required. At points approximately 10 feet apart, crockets were fastened to the battens.

On this particular spire the steel framework and the sheathing was carried up to the apron of the spike which forms the tip. The crown and the spike were assembled and placed on an iron pipe frame, but are not so long as to constitute a problem in erection or bracing.

The horizontal seams of the spire were all flat locked and soldered for water tightness.

The spire terminates in an open buttress section with the buttresses all covered with copper. Between the main buttresses small mullions with a section of tracery work of diamond shape are carried up outside the copper sheets of the spire. This work is all standard stamping.

Below the open section there is a louvered belfry. The design is

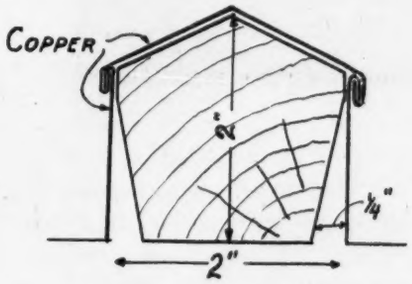


The main building is a huge structure with four main wings out from the tower. Each of these wings is protected by a batten-type, copper roof. The smaller ornamental wings are also copper covered. Buried copper was used in the buttress caps and parapets

again composed of buttresses directly below the buttresses of the open section. These buttresses are of heavy cross section and are also copper covered. These buttresses are four sided ending at the bottom in wings which are capped and carried down to meet with the batten corners of the main tower. Between the buttresses of this section are two-panel louvres formed of wood covered with copper sheeting.

At the top of the louvres there is a panel embellishment of standard stamping and above these panels a line of stamped copper cresting. Behind this cresting there is a shallow deck which provides space for a copper lined gutter draining through an inside copper leader of rectangular shape. This inside leader carries water down to the second gutter at the top of the main tower.

The louvres are not carried clear down to the tower, but a section of

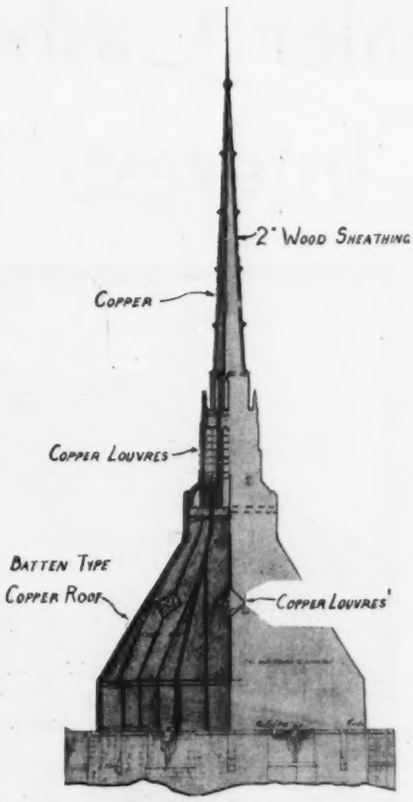


The panel battens of the main tower roof are of this cross-section. The cap is separate from the pan sheet. One-quarter inch is allowed for expansion

flat sheets, two sheets high, forms a solid surface around the base of the belfry.

The main tower is again eight sided and is broken only by one small diamond-shaped louvre which is embellished with copper tracery of standard stamping. There is a large expanse of copper on this main tower and because of this large area the tower is the dominating feature of the entire structure.

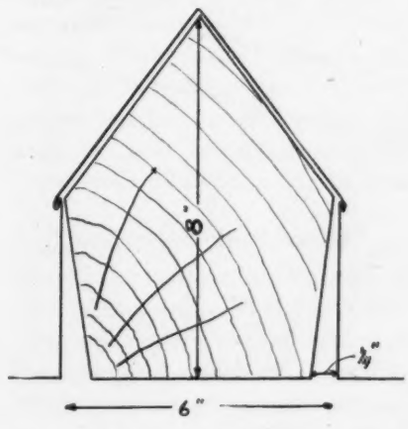
The hip ridges are all copper battens with the batten made of wood of large cross section. A detail shows the shape and size of the hips. Between each pair of hips three vertical battens are used.



The main tower is an unusual design. It is all copper from the finial to the base of the vertical face

These battens are also of wood, but of smaller cross section. The two inside rows of sheets are of rectangular shape for most of their height, but the four top sheets have the outside edge tapered.

The two outside rows of sheets between hips are tapered on the outside edge for all sheets in the panels. The main hips are carried clear up to the flat deck at the base of the belfry, the space between battens terminating in a row of



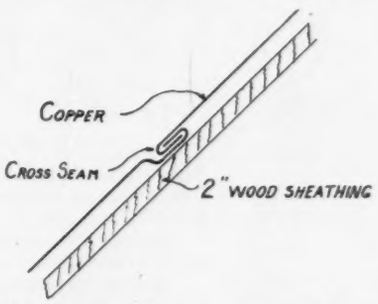
The hips of the main tower have battens of this size. Caps and expansion taper are identical with the smaller battens

embellished panels set with a slight projection from the roof sheets.

At the base of this slope there is a plain cornice with just enough projection to make a pronounced horizontal detail to break the surface of the roof.

The vertical sides of the tower below the roof are also copper covered with rectangular sheets set between vertical battens of the same sizes as the battens of the main tower roof.

Throughout the vertical sides and the sloping roof all cross seams are flat locked without solder to allow for expansion. The battens are all of the separate capped type and are all tapered at the bottom to provide for horizontal expansion in the metal. As shown on the detail, one



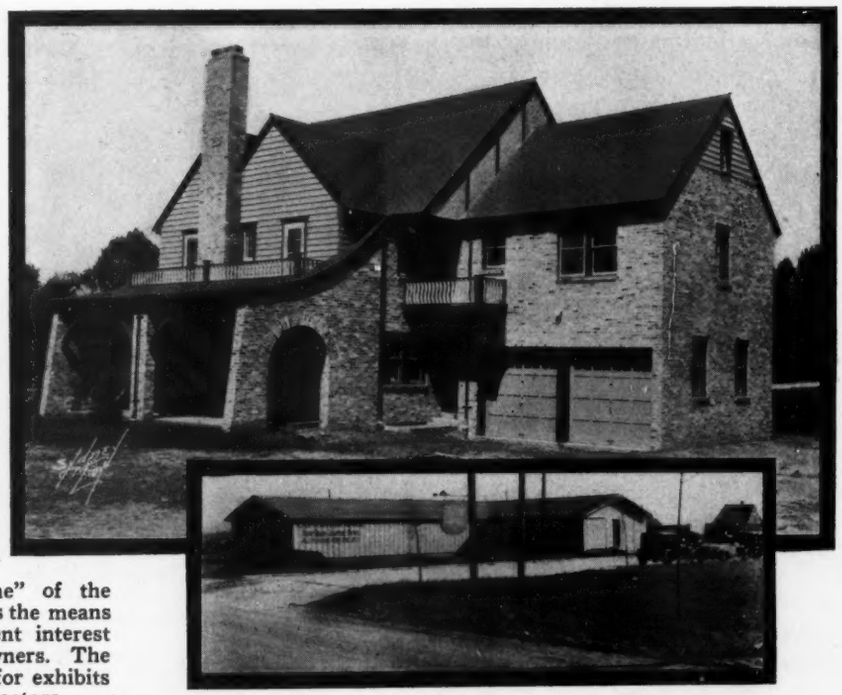
All cross seams on the tower are flat locked without solder except on the fleche where horizontal seams were soldered

quarter inch is allowed at each batten for expansion.

There are four main roofs and several smaller ones as well as decks on the building below the tower. All these roofs are covered with copper of the batten type. The pitch of these roofs is slight. An interesting feature of the roofs of the main axis is the use of a verticle face at the base of the roof. This face is covered with copper and terminates in a large box gutter, copper lined. The battens on these roofs are of the small size shown in detail and are capped with a separate sheet. The sheets on these roofs are all of large size extending from batten to batten and seamed horizontally with flat lock seams. Expansion is provided at the battens and in the seam which is not soldered.

(*Continued on page* 36)

Racine Dealer Cashes in On Public Interest in Model Home



This "All-Feature Home" of the Racine Journal-News was the means of arousing the intelligent interest of prospective home owners. The small building was used for exhibits by the various contractors

THE unusual advertising and publicity campaign of the H. J. Ortwig Sheet Metal Works, Racine, Wisconsin, is featured here, not so much as an example of a particular publicity method as an example of the resourcefulness of the contractor in fully capitalizing an opportunity for favorable publicity.

When the Racine *Journal-News* launched its $28,000 All-Feature Home project in the North Bay, an exclusive suburb of Racine, Ortwig's company was chosen to do the outside sheet metal work, consisting of the hip ridge, gutters and downspouts—all of copper—and the tin roofing. The metal clothes chutes and the ventilating hood over the kitchen range were also included in his contract.

Week's Progress Recited

As work on the model home proceeded, its progress was featured in each Saturday edition of the *Journal-News* from April 5 to August 30, and supplementary descriptive articles featured the work being done by the various contractors. At least a full page in each Saturday edition was devoted to the All-Feature Home, and each Saturday Ortwig's advertisement appeared on that page. From time to time articles appeared on the page telling about Ortwig's work in connection with the model home and items telling about Ortwig, himself, and his extensive experience in the warm air heating, sheet metal and roofing business in Racine. Two of these articles are reproduced herewith.

"Home Builders' School"

The building contractor who promoted the building of the All-Feature Home, advertised it as a "Home Builders School" and erected a temporary building, shown in the inset view, in which the various sub-contractors were allotted booths in which to display their work. This provided another opportunity to tie up with public interest in the home and to display items other than those which the contractor may have installed in the home. Unfortunately a photograph of Ortwig's booth is not available.

Advertising Appeared Weekly

While Ortwig's work on the home was confined to the items previously mentioned, as radiation heat was installed, it was apparent to Ortwig that people who read this particular department of the *Journal-News* and followed the progress of the All-Feature Home, were particularly interested in home building and the many conveniences which are available for modernizing existing homes. In his advertisements, therefore, he did not confine himself to featuring the particular kind of service that he rendered on this house, but included the entire range of service

he is well equipped to render for home owners. Unfortunately space permits the reproduction of only a few of these advertisements here, but they will serve to illustrate how Ortwig got an effective tie-up between his business and his service and the general interest of home owners and prospective home owners in this particular page.

In preparing the advertisements Ortwig had the valuable assistance of Miss Maude H. Boyd, who takes care of his accounts and other office routine. Both Ortwig and Miss Boyd insist that they know nothing about advertising and that the advertisements are, therefore, "not very good." It is perhaps fortunate that they didn't know much about advertising," and, consequently confined themselves to just plain sales talk about the materials and service they have to offer home owners of Racine. Of course they got a little help from the advertising department of the *Journal-News* in laying out the ads and in selecting suitable illustrations, but the preparation of the advertisements is essentially the

SHEET METAL'S ROLE IMPORTANT

It seems that there is scarcely a building project started today in which sheet metal does not play an important part. Those visiting the Henriksen & Journal-News All-Feature Home tomorrow will find this building no exception to the rule. From the standpoint of adornment, as well as for its lasting quality and protection from fire, the sheet metal ornamental ridges, downspouts and gutters installed by the H. J. Ortwig Sheet Metal Works reflect the most modern note in home construction.

H. J. Ortwig.

"It is undeniably true that sheet metal is rapidly replacing other materials in the erection of buildings, both public and private," remarked Mr. Ortwig, who has had charge of all the work at the All-Feature Home. One of the features in the home that will instantly appeal to the housewives is the all-metal clothes chutes, conveniently placed on both the first and second floors. This type of installation, completed by the H. J. Ortwig Sheet Metal Works, has distinct advantages over the clothes chutes of an earlier design. In fact, many of the older homes gave little or absolutely no attention to this detail of construction. The metal clothes chutes with their close fitting metal doors, found in the All-Feature Home, absolutely prevent any possible tearing or clogging of clothes in their passage to the laundry room.

"Perhaps you have noticed in driving through the country," continued Mr. Ortwig, "that sheet metal is being used extensively in the erection of garages, and storage spaces for garden produce and farm equipment." Metal garages are not an uncommon sight in Racine.

The sheet metal business as we moderns now know it has been a direct outgrowth of the old-fashioned "tin shop" of grandfather's day. "I well remember, as a lad, learning the tinner's trade, that the 'tin shop' was the center of every community," explained H. J. Ortwig in reminiscing of early days in the trade. To the tin shop the housewives brought their leaking pans and kettles. Here the men of the neighborhood congregated for discussions of politics, or to indulge in friendly gossip. If the gutters rusted through, or the downspouts leaked, the tin shop fixed them up.

Today very little of the work done by the earlier craftsmen in the trade, in the way of repairing home utensils, is done. "Occasionally a housewife brings her utensils to be mended," explained Mr. Ortwig. "These articles are almost without an exception wrought of copper or brass, and are hundreds of years old," he continued. The reconditioning and preserving of these heirlooms would scarcely afford enough business to keep the sheet metal shops busy.

The tinners of the days gone by are supplanted by a group of men highly specialized in sheet metal work. The J. H. Ortwig organization, for example, specializes in heating, ventilating and air conditioning ...in addition to various types of sheet metal work for gutters, ridges, downspouts, clothes chutes and the like.

ROOF, PORCH ADD MUCH TO HOME

All-Feature Project at North Bay Includes All the Latest.

Once the roof of the new home is on there comes to view the full beauty of the design which is borne in the mind of the architect. The walls of the new home mean little as far as a showing of beauty of line is concerned, but the roof and the porch of the period are the things that beautify, to the greatest degree.

Those who have followed the work on the Henriksen and Journal-News All-Feature Home project in North Bay will find that statement of facts to be true with that project as well. There have been several weeks of construction work by the Henriksen organization, but not until this week has there been a showing of what the actual appearance of the house is going to be.

The roof is being placed and by Sunday there will be a good showing. The carpenters are engaged in building the long porch along the entire south side of the structure. The roof slopes down gracefully from the ridge, adding beauty to roof and porch alike.

Copper Gutters Installed.

The best materials are entering into the construction of the home and that means that copper gutters are included in the specifications. In the supplying of this desirable feature of the project Mr. Henriksen has entrusted its installation to the Ortwig Sheet Metal works, one of the concerns which is making a display in Exposition Hall. The display will give one a good idea of the use of gutters that is being promoted. They wear well, look much better than the ordinary ones and have that feeling of freedom from the annoyance renewals that only occur to proud owners of the ultra-modern home enjoy.

Those who visit the home projects on Sunday should not fail to take note of this important feature in the structure. Compare it with the gutters that are on your own home and be thought to the wearing qualities which copper alone can give. The action of the elements has no effect on copper and it is for this reason that modern stores and factories are supplied with fronts of this material.

Interest on the Increase.

The week more than equals the preceding one as regards interesting features of the work on the home project. The coming week will reveal many interesting facts about the home. Last week home lovers were given an excellent idea of the floor plan of the home, the layout of the rooms and the size of them together with the closet facilities and other requisites.

Those who have not noted the essentials in the home can inspect for themselves. They will be able to visualize the completed home, to have in mind all of the attractive features which the completed structure will afford. No one in fact, viewing the completed home will those who have followed every step of construction so well know the quality of the workmanship that have entered into it, and the care of the work which the Racine mechanics have supplied and with which each step in the various operations has been taken. The 100 home project is by no means of many to which the attention of the general public is directed and promises to be the scene of a throng several times the number which has visited a single home in Racine in the past.

News items featured Ortwig's extensive experience and the important role of sheet metal in the well constructed dwelling house

work of Miss Boyd, who also assembled the data and prepared the outlines for the news items about Ortwig.

There is no means of even approximating what business has resulted from this particular campaign and Ortwig did not go into it with the hope of any immediate and direct return. But when questioned on the subject, he recalled

Well arranged single column newspaper advertisements have ample attention value

that during and since this campaign he has been receiving requests to figure on work for several large builders, architects and real estate concerns whom he had not previously served or solicited. While some of these inquiries may have come through the recommendations of his old customers, Ortwig feels sure that most of them could be traced to his work in connection with the All-Feature Home or to his advertising and publicity notices which appeared in connection with it.

Sustained Interest Valuable Feature

Perhaps the most valuable feature of this particular campaign is the continuity and sustained interest which it automatically provided. Newspapers often publish special supplements featuring some large building project and give the various contractors and supply dealers who furnished materials or service the opportunity to "run an ad" in connection with the elaborately illustrated supplement. Sometimes the contractors participate in such advertising because they feel obligated to the architect or manufacturer whose work or whose building is being featured. Such "one shot" publicity stunts are usually of dubious value to the contractor who does not advertise regularly, because they do not provide for sustained interest or the cumulative value which attaches to the continuous appearance of advertising. The campaign we are discussing here possessed this essential characteristic and Ortwig capitalized it to the fullest extent.

Consistent User of Newspaper Space

It must not be assumed that this publicity program was Ortwig's first venture in advertising. He has been a consistent advertiser and, doubtless it is because of his regular use of newspaper space and his belief in the value of the right kind of publicity, that he was able to foresee the advantage of participating in the All-Feature Home campaign. Other cities, large and small, have similar projects under the auspices of the local newspaper, the Chamber of Commerce, or other town or neighborhood business associations. Regardless of whether or not such an opportunity may be presented to you, however, the chief idea to be drawn from Ortwig's experience is the necessity of doing whatever advertising you do in accordance with a consistently planned and sustained program. Ortwig will continue to cash in on the valuable publicity he got out of this campaign by continuing to run his advertisements regularly.

Newspaper advertising, or any form of advertising for that matter, will bring the best returns only when it appears consistently and regularly according to a well planned schedule.

This advertisement provided an effective tie-up with the interest in the "All-Feature Home" and presents the complete range of service which Ortwig is equipped to render to Racine home owners

FAN FUNDAMENTALS Part [VIII]

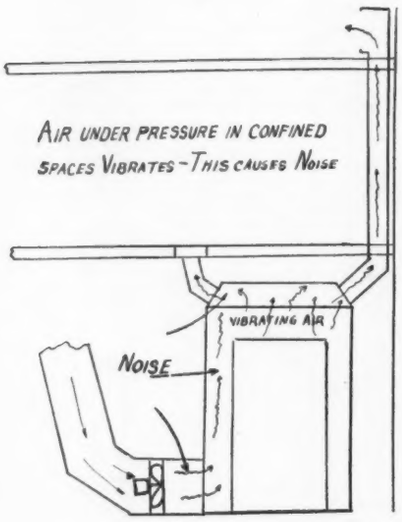
With Particular Reference to the Use of Fans in Heating

By G. A. VOORHEES
Heating and Ventilating Engineer, Indianapolis, Ind.

THERE is little excuse for a noisy furnace fan installation in any residence or similar building where quiet operation is desirable.

Although there is no such thing as an *absolutely* noiseless fan, it is possible by choosing the right fan for the job and installing it correctly, to insure *practically* noiseless operation.

The sources of sound in a noisy fan system are:



Air forced through the system by a fan tends to vibrate. This vibration is transmitted to the metal, resulting in noise

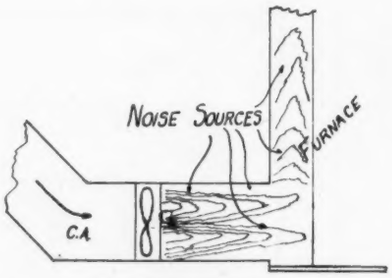
(1) Air vibration caused by turbulence when the air is driven through the system at high velocity.

(2) Air vibration produced by fan blade impact against the moving body of air.

(3) Mechanical noises from bypass dampers when the fan is of the pressure type with provision for gravity flow.

(4) Mechanical noises originating in the motor.

(5) Mechanical noises from the fan and belt.



The air ahead of the fan is sluggish. The fan has to set up air waves resulting in pressure. The blade cutting this pressure makes noise

The heating contractor who must bear the brunt when users complain that furnace fans are noisy, is not directly responsible for those noises that are due to mechanical construction of the fan; only the fan manufacturer can prevent them.

The contractor can protect himself, however, by learning the causes of various fan sounds and by avoiding the use of fans that are inherently noisy in operation. He can further guard against complaints by installing his fans so as to prevent amplifying the unavoidable fan sounds.

He can definitely prevent noise due to the turbulence accompanying high air velocities in the duct system by holding those velocities down to a reasonable limit.

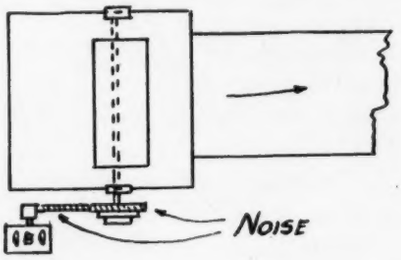
When a pressure type fan is used and the plant operates alternately by fan pressure and by gravity flow, the piping has to be large enough to permit efficient operation under gravity flow conditions and in such a plant it is not likely that the air velocities through the ducts with the fan running will be objectionably high.

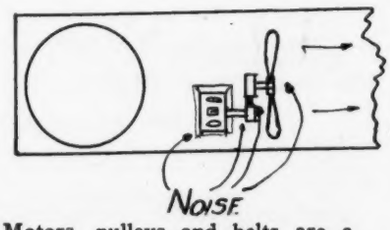
With a booster type fan also, the piping will (or should be) reasonably close to Standard Code size, and again the air velocities in the ducts will be moderate.

But with either type of fan, the velocity *through the fan itself* may be so high as to cause considerable turbulence and noise.

This is best avoided by using a larger fan operating at lower speed.

In the case of oil or gas fired furnaces where the burner operates intermittently, nothing is gained by providing for gravity circulation. With the customary automatic control, the fan starts when heat is to be delivered and stops when the burner cuts off and the furnace cools. Since no provision need be made for gravity flow, the ducts can be reduced materially in size





Motors, pulleys and belts are a constant source of noise. These parts get loose, wear, vibrate and each noise is transmitted to the system

G. A. Voorhees

and the air carried at relatively high velocities through the return air ducts and the warm air piping system.

In a plant of this type trouble may arise if the pipes are made so small as to cause an annoying sound of air rushing through the system. The air vibration is transmitted to the metal ducts which amplify the sound. There are many jobs in which velocities in excess of 1,000 feet per minute are maintained without objectionable noise, but the cautious heating contractor, unless he has had considerable fan experience, will do well to avoid such installations unless he avails himself of the services of a competent engineer who has had ample practical experience with furnace fans.

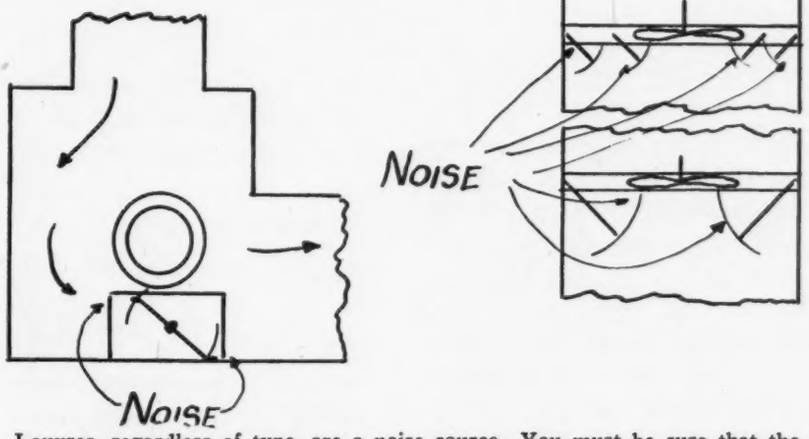
For residence heating, it is much safer to hold the velocities down to six or seven hundred feet per minute. Table No. 1, which is reprinted from the excellent catalog of Lakeside Blowers (issued by Lakeside Company, Hermansville, Mich.), is a safe guide to follow. Incidentally, any heating contractor who wants to study the more technical phases of fan system design, ought to have a copy of this catalog.

Next to be considered is the air velocity through the fan itself and, unfortunately, there is no agreement among the manufacturers of either the propeller-type or centrifugal type (blower) fans as to what the maximum velocity should be for satisfactorily quiet operation. This lack of agreement is due to several causes, chief among which is the fact that the shape and pitch of the blades and (in the case of the centrifugal type) the design of the cut-off, have considerable bearing on the quietness of operation at various velocities.

The writer has tested a wide variety of types and sizes of both propeller and centrifugal fans of various makes and from the tests of different types of propeller fans ranging from twelve inches to twenty-four inches in diameter, a rather crude "thumb rule" was derived: *The maximum volume of air in cubic feet per minute that can be handled quietly by the average propeller fan not less than 12 inches or more than 24 inches in diameter, is equal to 100 times the fan diameter in inches minus 400.*

From this simple rule, the maximum volume of air that could be handled quietly by the *average* 12-inch propeller fan would be:

$(100 \times 12) - 400 = 800$ cubic feet per minute (c.f.m.).



Louvres, regardless of type, are a noise source. You must be sure that the maker's insulating is in good condition. Their noise, however, is periodical, not constant

Since the velocity in feet per minute is equal to the volume in cubic feet per minute divided by the cross sectional area *in square feet,* it fol-

TABLE 1

Air Velocities in Feet per Minute

Type of Building	In Horiz. Heat Ducts	In Heat Risers	Thru free area of Supply Register	Thru free area of Returns Register	In Return Risers	In Hor. Ret. and Vent. Ducts	Required Temperature at Supply Registers
Residences	500 to 700	300 to 500	100 to 300	100 to 300	300 to 500	300 to 500	90°F to 120°F
Schools	800 to 1000	500 to 600	300 to 400	300 to 400	500 to 600	600 to 800	80°F to 120°F
Churches	700 to 900	400 to 600	300 to 500	300 to 500	400 to 600	500 to 700	80°F to 120°F
Auditoriums and Convention Halls	800 to 1000	500 to 600	300 to 500	300 to 500	500 to 600	600 to 800	80°F to 120°F
Garages and Industrial Buildings	1000 to 1400	600 to 1000	400 to 1000	400 to 600	600 to 1000	800 to 1200	90°F to 140°F

Table 1, reprinted from the Lakeside Company's catalogue, is a safe guide to follow in determining your maximum velocities through the system

TABLE 2

Maximum Air Volumes and Velocities Through Propeller Fans for Quiet Operation

Fan size	Area sq. ft.	Maximum volume for quiet operation c.f.m.	Air velocity through fan ft. per min.
12-in.	0.785	800	1019
14-in.	1.07	1000	935
16-in.	1.40	1200	857
18-in.	1.77	1400	791
20-in.	2.18	1600	734
22-in.	2.64	1800	682
24-in.	3.14	2000	637

Table 2 gives the maximum fan capacities for quiet operation according to the author's rule

lows that the air velocity through the 12-inch fan would be:

$$\frac{800 \text{ c.f.m.}}{0.785 \text{ sq. ft.}} = 1{,}020 \text{ feet per minute (f.p.m.)}$$

Going from the smallest to the largest propeller diameter included in the above rule, we find that: for a 24-inch fan:

Fan capacity $= (100 \times 24) - 400 = 2{,}000$ c.f.m.

$$\text{Velocity} = \frac{2000 \text{ c.f.m.}}{3.14 \text{ sq. ft.}} = 637 \text{ f.p.m.}$$

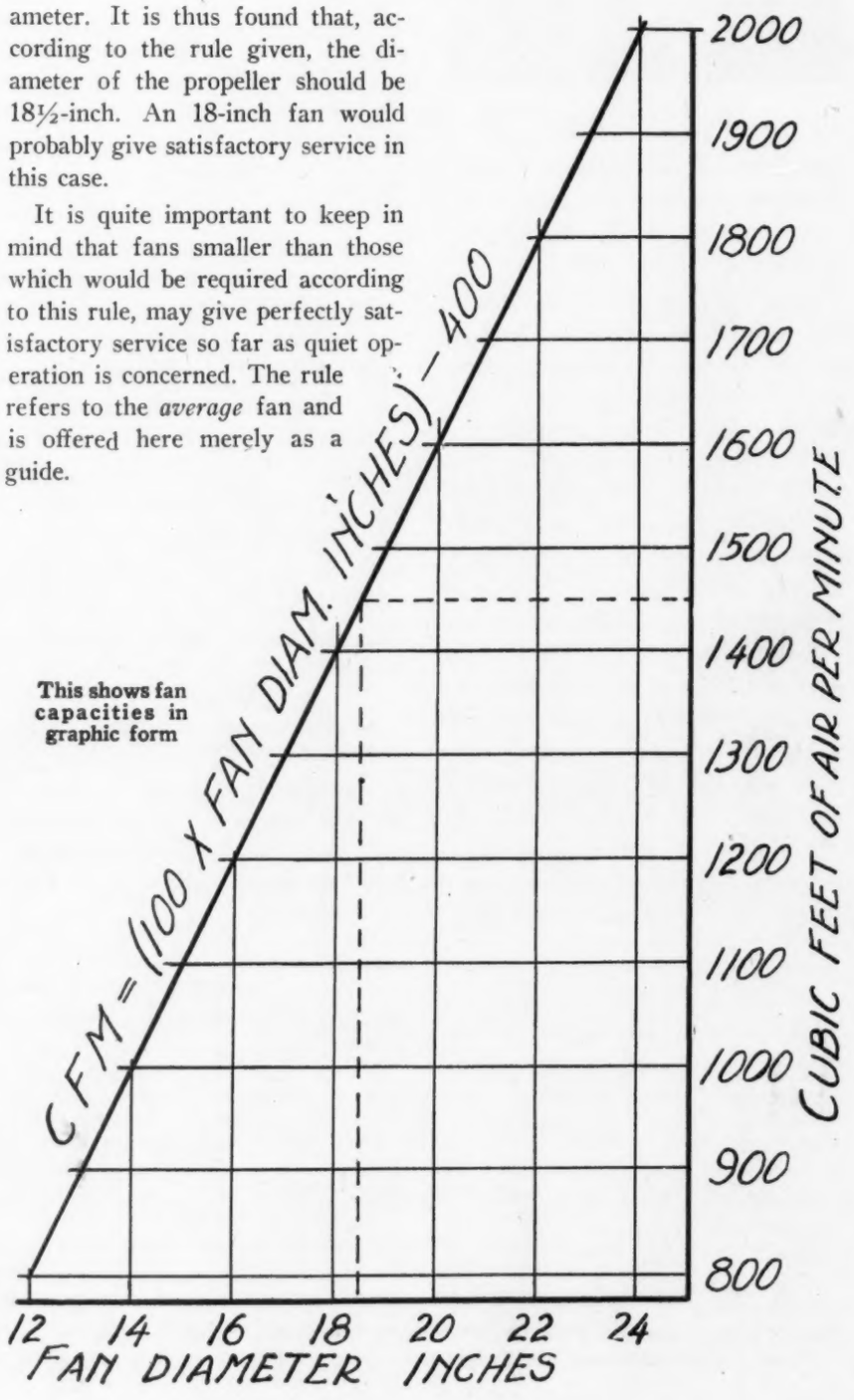
The accompanying Table No. 2 gives the maximum fan capacities for quiet operation according to this rule, together with the corresponding air velocities through the fans. The data as to fan capacities are also given in graphic forms (Fig. 1). If the formula were mathematically correct the graph would be a curved line instead of straight but between the diameter limits of 12-inch and 24-inch the curvature is relatively slight and the rule is simplified by assuming the graph to be a straight line. A more complete rule would also include a consideration of the rotative speed of the fan.

To illustrate the use of the chart: Suppose in a given heating plant, the fan is to handle 1450 cubic feet of air per minute; what diameter of propeller fan should be used to insure quiet operation?

Locate on the vertical scale at the right, the point representing 1450 c.f.m.; project horizontally to the left to the point of intersection with the graph; then vertically downward to the bottom scale of fan diameter. It is thus found that, according to the rule given, the diameter of the propeller should be 18½-inch. An 18-inch fan would probably give satisfactory service in this case.

It is quite important to keep in mind that fans smaller than those which would be required according to this rule, may give perfectly satisfactory service so far as quiet operation is concerned. The rule refers to the *average* fan and is offered here merely as a guide.

It should also be borne in mind that the propeller fans tested and used as a basis for the rule, were given their trials under what were believed to be "ordinary" operating conditions. In each case the test was made with the fan connected up to a furnace in actual operation. Reasonable care was used in making the installations so that the conditions under which each test was made would approximate as nearly as possible, the conditions existing in the average job.



If We Must Have Trouble

LET'S FIGHT IT OUT NOW

By **C. F. MALONE**
International Heater Co., Davenport, Iowa

MOST of us in the warm air heating field read our trade papers and study over the material presented in the various issues and oftentimes wish we had time to sit down and write what we think about certain controversies.

Most of the time, however, we never get around to writing.

In one way that is the trouble with too many of us in the warm air heating industry—we want to make our voices heard, but we never get around to yelling. And in this day and age if a person wants to be heard he certainly has to yell.

In my own case I can recall numerous times when I just "itched" to write what I knew about a certain subject—but I didn't do it. Most of the readers have felt the same way, I feel sure.

I know I am just like thousands of other warm air heating men. I want to see my business grow and my profits increase. I feel some justifiable pride in the work I do and every job I put in makes me feel that I have done a worth while deed.

My ambition is to make the public forget that there ever was an industry known as the "hot air" industry; that there ever was a heating system known as the "hot air" system. I would like and I try to do everything I can to advance the cause of warm air heating so that just as soon as possible this warm air heating industry, of which I am a small part, will reach the position in the heating field to which it is entitled. That position is at the top of the heap. For our system is the best there is and it won't be long before the home owning public knows this.

We can't overlook the fact, though, that our industry is being held back by a lot of warm air heating installers who are afraid to step out and do the things they should.

These fellows are following the path of least resistance. If these men install a furnace in a house of a certain type and size they try to install an identical system in every house approximately like it. A lot of these heating men kid themselves by saying that what works for one job ought to work on every other job like it.

Too often the heating man bows to the wishes of everyone connected with his job. The result is that when the job is finished everyone feels they ought to pick flaws. If these troubles are ironed out before work begins a lot of trouble and grief are eliminated. C. F. Malone says—"Fight it out first"

The truth of the matter is that in nine cases out of ten it won't work.

I have always believed that every furnace job is a problem in itself. Every job is a new one and the quicker I can forget all other jobs the quicker I can get to the bottom of the problem I have on hand. I didn't reach this idea all in one jump. It took years to convince me that the idea is right, but once I did adopt the idea I found that my jobs were usually successful.

Keeping this in mind I always look at the chimney as soon as I get a job. If the chimney is right I am ready to go to the next step. If the chimney is doubtful I stop right there, for there is nothing to be gained by installing a good heating plant if the chimney won't function as it should. The next step is to figure the heat loss and fit the furnace in mind to the job. In this the Standard Code is unquestionably the best guide we have and we ought to stick to it.

It seems to me that too many heating men let the owner dictate details. For example, the place the furnace shall be set. Now every heating man knows that if a furnace is to work right on gravity it can't be stuck out of the way in some corner. It's got to be just so and so and the quicker the owner or the contractor understands that the job can't be guaranteed unless the heating man's wishes are met, the quicker the details are satisfactorily arranged.

The very same thing applies to locating the warm and cold air pipes and stacks. The heating man knows where and how they ought to go. If he can't put them there then the job ought to be switched from gravity to forced air.

Too many contractors try their hardest to please the owner and contractor while the job is under way and then turn around and fight like the mischief after it is finished. And their cry is, "If you had let me put it in as I wanted to it would heat now."

I attended a hard school on this subject many years ago. I worked for a contractor who believed in meeting trouble just as quickly as possible and getting it over with. A lot more of our fellows ought to do the same thing.

(*Continued on page 37*)

OVERHEAD

An Analysis of Operating Costs of Some Typical Shops

By **JOSEPH G. DINGLE**

IN the November 22nd Issue of ARTISAN, I discussed some general points of the article by Mr. Benjamin F. John on OVERHEAD ON LABOR ONLY, published in the October 11th issue of the ARTISAN. This subject of the application of overhead is a live one and I reget that we are not hearing from more shop owners.

What's the matter with you fellows? You have overhead, and lots of it. How do you load it on your prime or direct costs? Let's get some discussion from the fellows who are making money out of a sheet metal shop. Let's hear from some of you fellows who are LOSING MONEY through improper pricing of work. This magazine and its writers are trying to bring home to you something worth while. Are you getting it or does the matter fail to interest you?

We know what OVERHEAD is —indirect business expense—which cannot be allocated specifically to each job—but must be loaded on each job as a percentage of one or more of the prime costs.

In building up our estimates, we take off our materials and price them AT COST, usually. We then build up our labor cost—estimated time required to convert the material into the salable job. This labor, also is, or should be at its cost. On the procedure thus far, Mr. John and I agree. It is on the next step—applying the OVERHEAD—that we differ. It is here that both Mr. John and I ask the warm air shop owners to give serious thought to both methods and determine for their own shop the best method of applying OVERHEAD.

You shop owners are quite familiar with the first two steps in building up your estimates. You take off your materials and price them. You estimate the labor required and price that at COST. Some few price labor at a price per hour in excess of cost, taking care of Overhead in that manner. That method is a poor one, as will be shown in this article. Follow me through the various steps taken and I am sure you will have a better understanding of this OVERHEAD. Here I want to insert Table A—which is the operating story of a shop for three consecutive years. These figures are taken from Mr. John's Table I—items 1, 2, and 3.

Don't just pass over this Table of Figures as being just so many figures. They are a very interesting story of three separate year's operations of a sheet metal shop, and I feel quite sure you will agree with me that this shop owner needs sympathy—and a better system of pricing his jobs. He made $765.71 the first year—$63.64 per month.

That's nothing to brag about.

The second year he LOST $4.59 or 36¼c per month. There's no fun in doing business just for the pleasure of the thing. The third year he LOST $207.45, or $17.57 per month. He actually paid his customers to do business with him. He gave them $101.25 worth of Material labor and overhead for $100.00. Of course, we know he did not intend to do that—he was trying to make a profit but there was a slip somewhere. Let's see if we can find where he overlooked a bet.

First, let us look at his Sales Dollar for the first year and see how it was divided up. His sales dollar, like yours, has only ONE HUNDRED CENTS in it. Look at Fig. 1 SALES DOLLAR—YEAR 1. Material consumed 27.88c of it; Direct Labor ate up another 27.78c and Overhead accounted for 39.75c. Material, Direct Labor and Overhead consumed 95.41c of the dollar—leaving only 4.59c (100 cents less 95.41c) for

TABLE A

	Year One		Year Two		Year Three	
	Amount	Per Cent	Amount	Per Cent	Amount	Per Cent
Material	$ 4,653.76	27.88	$ 2,643.58	20.23	$ 7,062.46	42.58
Labor	4,637.72	27.78	4,305.57	32.95	5,076.02	30.61
Total Material and Labor	9,291.48	55.66	6,949.15	53.18	12,138.48	73.19
Overhead	6,636.00	39.75	6,188.30	47.36	4,652.38	28.06
Total Cost	15,927.48	95.41	13,137.45	100.54	16,790.86	101.25
Sales	16,693.19	100.00	13,066.95	100.00	16,583.41	100.00
Profit—Loss (L)	765.71	4.59	(L)70.50	.54	(L)207.45	1.25

profit. Small enough for any business. Of course, we don't know what profit he figured on making, but we do know that for Year 1 he did make $765.71 profit on Sales aggregating $16,693.19—or 4.59 per cent profit in his sales.

Having now the actual operating results obtained for Year 1, let's see how we can lay our plans to make a better profit in Year 2, which is just starting.

Our first step is to estimate our valume of business for the coming year. Yes, you are right, we can only guess at what business we are going to do in the coming year. Our best guess will be that it will be about the same as the year just closed. All right. Our sales for Year 2 will be placed at $17,000.00. We then take a look at our overhead costs for Year 1 to see if they are about normal. Let's say they are, and we will then predict that our overhead for the Year 2 will be $6,500.00. Let's say that we want to make 10 per cent profit in every dollar we take in — or $1,700.00 profit out of $17,000.00 of sales which we expect to have.

Now we are ready to do some figuring.

We expect to receive	$17,000.00
Our Overhead cost is	6,500.00
Balance	$10,500.00
Profit desired	1,700.00
Balance, representing the amount available for Material and Labor	$ 8,800.00

In other words, to accomplish our purpose—that of making $1,700.00 profit out of expected sales of $17,000.00 with overhead costing $6,500.00, we can spend only $8,800.00 for material and labor. Now, let's start at the other end and see how we must use this information in pricing our work. You will notice I have made no attempt to separate labor and material. You know, and I know, that our customers are going to use varying amounts of labor and material, and while we cannot determine what

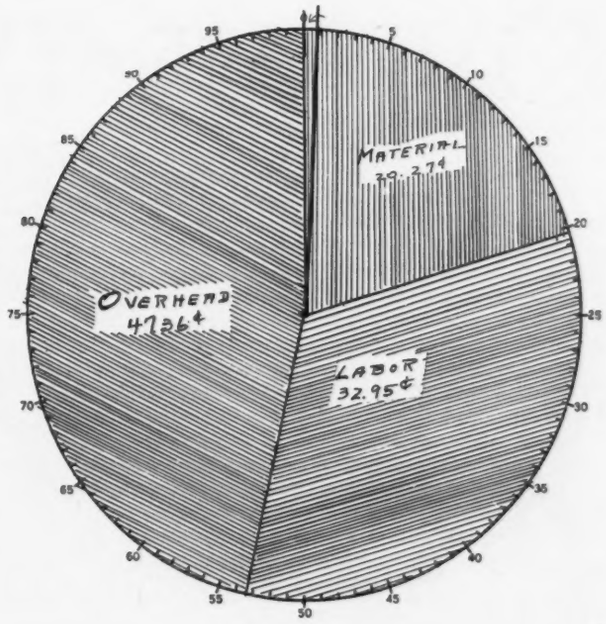


FIG. 1

This contractor's sales dollar shows that only 4.59 cents came back as profit. Only $765.71 were profit from a business of $16,693.19. This is net after Overhead is taken care of, but is too small for continued success

part of that $8,800.00 will be material and what part will be labor, we can proceed on the basis that we are going to use $8,800.00 of the two—material and labor. We start our figuring somewhat like this:

Material and Labor Cost	$8,000.00
Overhead	6,500.00
Profit	1,700.00
Total, or Sales Price	$17,000.00

Then, we determine the relation each of these items bears to the other, thus:

Material and Labor Cost	$ 8,000.00	52%
Overhead	6,500.00	38%
Profit	1,700.00	10%
Total, or Sales Price	$17,000.00	100%

Now, we can prepare our formula for pricing our work. If material and labor amount to $8,800.00, or 52% of our selling price, we can ascertain our selling price by multiplying $8,800.00 by 100 and dividing by 52. $8,800.00 times 100 equals $880,000.00. Dividing by 52 we get $16,923.00, our selling price. (Note: Through failure to use decimals this figure is $16,923.00 rather than $17,000.00—Difference is only $77.00.)

Let's take a look at the practical operation of this formula. Suppose you are ready to price a job—and you have figured your material and labor costs. They amount to say $375.00. All right. Multiply by 100 by putting down $37,500.00. Divide by 52, and you will get your selling price, or $721.15, which includes Material, Labor, Overhead and Profit.

Let's just see how it works out.

Selling Price	$721.15	100%
Material and Labor	375.00	52%
Gross Profit	$346.15	48%
Overhead (38% of Sales)	274.03	38%
Profit	$ 72.12	10%

It works and we get a profit of $72.12 on our sale of $721.15. PROVIDED — we sell $17,000.00 worth of work, costing for material and labor $8,800.00 and our overhead is $6,500.00. Now, you and I know business fluctuates a great deal. If our estimate of $17,000.00 is going to work out, we might expect to find at the close of, say, June, that we would have finished one-half our year—therefore, we might expect to find that our sales to June 30 were ½ of $17,000.00 or $8,500.00. We, too, would expect to find our overhead cost to that date to be $3,250.00 (½ of

$6,500.00). Our sales are not as large as we expected and our overhead is a little higher than we estimated. What must we do to remedy this defect in our figuring? Of course, we must try to sell more goods and economize some in our overhead. But, we can start out again, as we did the first of the year and build up some new cost figures. Let's see how that works.

Let's assume sales for the last half of the year will be	$8,000.00
Overhead for same period will be	3,250.00
Deducting, we get	$4,750.00
Profit desired—10%	800.00
Balance left for Material and Labor	$3,950.00

We then turn these figures around and find our percentages.

Material and Labor	$3,950.00	49%
Overhead	3,250.00	41%
Profit	800.00	10%
Selling Price	$8,000.00	100%

Then to accomplish these results we must price our jobs by using as a divisor 49 instead of the 52, as we started the year. Let's take that same job we had a while ago. $375.00 times 100 divided by 49 gives us a selling price of $765.30. Then we have:

Sales Price	$765.30	100%
Materials and Labor	375.00	49%
Gross Profit	$390.30	51%
Overhead 41% of Selling Price	313.77	41%
Profit	$ 76.53	10%

Now we have illustrated the case with which we can CORRECT OUR FIGURING FORMULA. If, as so often happens, the formula is unchanged during the year, and sales volume is below the estimate used, the overhead will not be completely charged to customers in sales price simply because there is not the predicted volume.

Let's take a look at the Year 2 Sales Dollar four our friend whose figures are shown in Table A. He had Year 1 to guide him in his predictions for the coming year and yet, if he did use them, he certainly got lost along the way. Sales Dollar Year 2 shows Material, 20.23c; Labor 32.95c; Overhead, 47.36c; and these three total 100.54 cents and he sold for a dollar having only 100 cents. He lost 54/100 of a cent on every dollar's worth sold. He did not, evidently, correct his basis for pricing his work, as we did after June 30th.

All I am going to say about Year 3 — where this contractor lost $207.45 or sold goods costing him $101.25 for $100.00 is that he may be satisfied to apply Overhead on Labor only, even if it does cost him money. I cannot believe he paid much attention to his overhead, otherwise he might have corrected his basis of pricing his work before it was too late. The fact remains, however, that he does apply Overhead on Labor Only and he LOST MONEY. Whether it was because of careless figuring or the use of Overhead on labor only, I can not say. He did lose money. He could, in my opinion, more easily have checked his figures early in the year and changed his formula had be been applying Overhead on Material and Labor.

What do you think about this Mr. Shop Owner? Let's have your experience on this question!

Joseph G. Dingle, C. P. A.

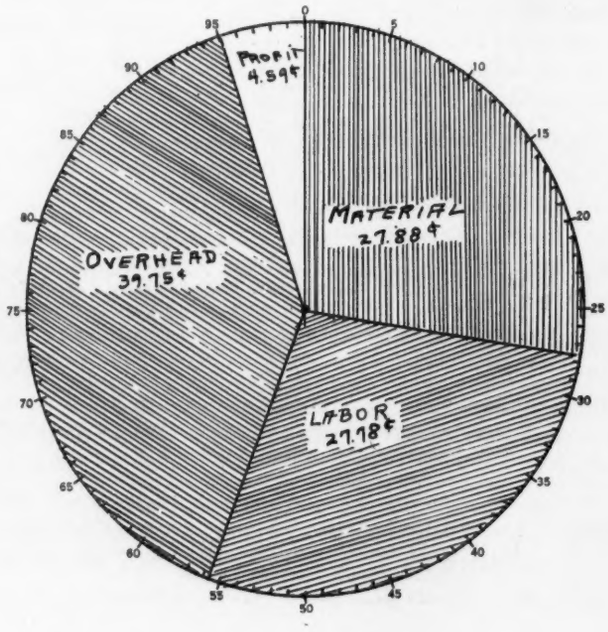
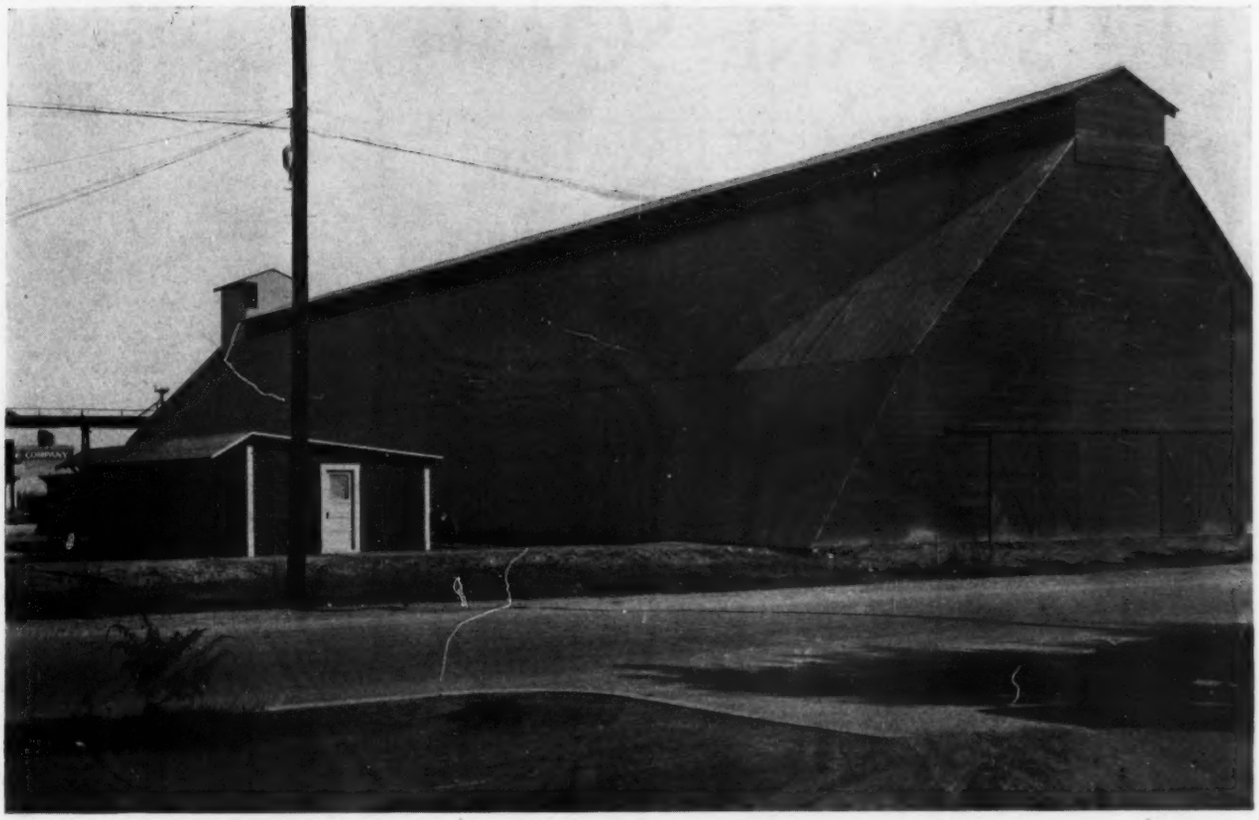


FIG. 2

Although the contractor had his previous year to guide him, his second year showed a loss of just over one-half a cent on every dollar of business



These sheds of unusual shape are used to store cotton seed. The combination roof and side follows the natural slope of piled cotton seed. Taking advantage of nature has resulted in economical storage buildings of corrugated iron

Corrugated Iron Used to Roof Cotton Seed Storage

CORRUGATED iron roofs have long been recognized as of foremost importance in protecting farm and industrial buildings. In many manufacturing and industrial operations, however, both the roof and the siding may be advantageously combined, when constructed of corrugated sheets, thereby lowering the unit cost per cubic foot of interior storage.

In the cotton growing states of the Southwest corrugated iron has been used to develop specially designed buildings used to store cotton seed. These buildings are of unusual design, the idea being to provide the greatest storage space within the least area and conforming to the natural laws of stored seed.

An official of the Western Cotton & Oil Co., speaking of his company's cotton-seed storage sheds, said:

"We never even considered any other type of roofing. Corrugated metal saves us the cost of wood sheathing and expensive framing besides being fireproof, and it is quickly erected whenever we have to store material.

(Continued on page 37)

This picture shows some of the other buildings of the same company. These, too, used iron lavishly

LET'S MAKE SOME MONEY

ESTIMATES

By **BENJAMIN F. JOHN**

WHEN you received that order in the mail this morning, "Please proceed with the contract, as per your estimate of $.....," did you feel like the fellow in the sketch? If you did not you are the exception.

Contact with nearly a hundred and fifty shops in various localities during 1928-29-30, has impressed me with the fact that there are many different methods of estimating, but that only a small proportion tell the truth when compared with the cost sheet of the finished job.

What is your estimate? A guess? It need not be.

Some men seem to think that if they put fine machines in the shop and hire the best mechanics obtainable, the business will run itself. But there is no substitute for brains, therefore, it is necessary to KNOW just what these machines and men will do and how much time it will take to produce a certain amount of work.

Therein lies the most important item in any estimate.

And the figures should always be made a matter of record on every job for future reference.

It is NOT possible for the average shop to clock every operation of their work inside and outside. But each shop has a number of previous estimates given and won, and the job record sheet for each one showing the cost. Is there any better guide than these records when estimating?

A recent survey of 12,000 manufacturing plants and shops, some in our trades, proved that many businesses depend on an individual who is supposed to have the experience to make estimates. In some instances dependence was laid on information gained through a comparison with outside bids made up in much the same manner.

When an order from one of your estimates comes in, do you feel like this? If so your estimating system is all wrong

All jobs, even large ones, have a duplicate in the course of time and unless a shop is afraid to figure up and compare the cost of each job, a cost record will show just how to estimate accurately. A list of past jobs, even small ones, will show the results of previous experience, and as small jobs in our trades are but sections of larger jobs, this record becomes quite complete and very useful.

Why give "snap estimates"? They are one of the curses of our business.

Most of our customers are reasonable, and if the average shop will cease giving estimates on the spur of the moment, and first spend a few minutes with past records, a great deal of money can be saved. It usually turns out that the customer merely wanted an approximate estimate, and would have waited for a few hours, as he did not intend to ask anyone else anyway. No man can record in his memory all the costs of all past small jobs.

Profit is arbitrary with every

Good estimating should be one of the most thoroughly studied phases of the heating and sheet metal business. Yet, for some unknown reason, this subject has always been sidestepped.

When we realize that today at least 75 per cent of our business comes from estimates given, it is easy to understand that good estimating constitutes one of our straightest paths to better profits.

No one understands this better than Benjamin F. John, yet, because he has been through the mill, we have asked him to be the goat and tackle this problem, with the hope that others will express their views and advance some constructive criticism.

Standard Warm Air Heating Estimate Blank

The Master Tin and Sheet Metal Workers' Association of Philadelphia

Approved and adopted January 2, 1917

No.	furnace	in. grate	*Brought Forward.*
	FURNACE CASING		metal lath
sheets No.	galv. iron	lbs. @	plastering wire
	furnace top		patent plaster
sheets No.	galv. iron	lbs. @	heat pipe dampers
			"
			"
furnace heat pipe collars		in.	"
		in.	registers
		in.	"
		in.	"
			"
joints	m. galv. smoke pipe No. 24 gauge		"
	" " Tee joint and cap		"
	" " galv. elbow		slate borders
	" " changes or tapers		half elbows
	" " cast damper		lbs. nails
			" wire
lbs. furnace cement			" solder
X bolts			" canal
	INNER LINING		safety thimbles
cast X to			ft. galvanized iron chimney top
black iron, 24#		lbs. @	ft. " " cold air duct
			sheets galv. iron
lbs. asbestos paper			ft. screen
	HEAT PIPE		ft. muslin
	IX tin heat pipe @		sheets tin IX for stripping, etc.
	IX "		cold air face, size
	IX "		inside air register face
ft.	IX "		lbs. asbestos for pipe covering
ft. "	IX "		" paste
"	IX reversible elbow		" mortar
"	IX "		" sand
"	IX "		No. brick
"	IX "		
"	IX tin register boxes		hrs. time man in shop
"	IX "		" " helper "
"	IX "		" " men outside
ft.	IX tin flue lining		" " helper outside
ft.	IX "		exceptional hauling charges and freight
ft.	IX "		" cartage "
cast flue dampers and knobs			
"			Total net cost of job. . .
"			Overhead charge Per cent on Labor
tin flue changes			Gross cost of job. . . . .
"			Profit Per cent. . . . .
"			Selling price of job. . . .
	Carried Forward.		

GUARANTEE PLATE. .....

DIMENSIONS

Property ..... Street Date ..... 19..

Owner ..... Contractor .....

Address ..... Address .....

ROOMS	Point of Compass	Wide	Long	High	Cubic Feet	Heat Sq. Ft.	Glass Sq. Ft.	TOTAL	PIPES	REGISTERS

Height of Cellar .....

Kind of Building ..... Old or New .....

Material of Construction ..... Exposed or Protected ..... Coldest Exposure .....

Size of Chimney ..... Height of Chimney .....

A good standard form for estimating warm air heating installations is essential in any shop. Even more important, every item on the sheets should be filled in every time. If you figure correctly and use every space needed, your estimate can't go wrong. This is the front and back side of the form used by the Philadelphia association

shop. But a bid below cost is every competitor's business, and the constant winner of jobs below cost has no complaint against any method or knock used against him.

Many fine buidings, erected by owners who could well afford and would have paid a decent price and profit, bear witness that certain price cutters once existed.

Is it not to the interest of every shop, then, to forget how the other fellow estimates and stick to its own facts?

I know of one fellow who cut his estimates whenever he learned that a certain shop was bidding. But he fell into the pit he was digging for his competitor, and he will bid no more. It is also reported that one large shop, employing from 50 to 150 men, had an estimator who only needed a piece of paper about as large as a postage stamp to figure a $50,000 job. True or not, the shop went out of business three times.

Why use other's estimates as a basis for ours? To estimate without knowledge and facts means a loss. It must be remembered that the shop with modern methods and good organization can and does take jobs at a profit at what seems low prices. And is it not reasonable

The sheet metal estimate sheet is comparatively simple. There are few items, BUT, every item means lots of money. If you miss one of these, you can be sure you are going to lose money

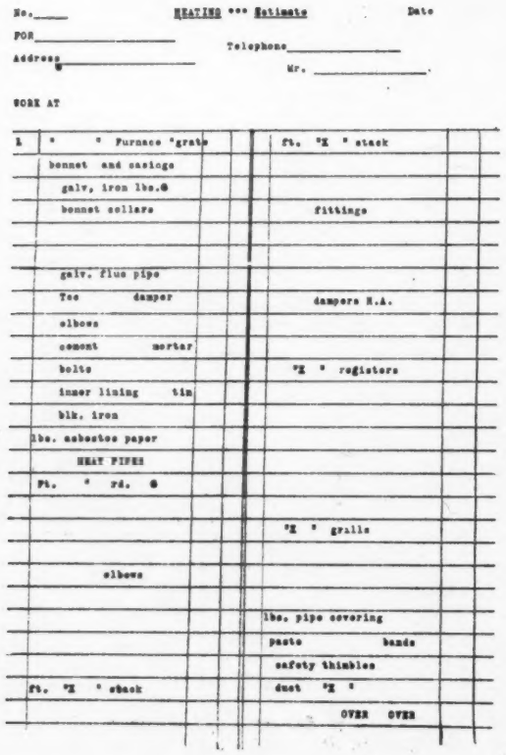
No. SHEET METAL *** Estimate Date

FOR

Address Telephone

WORK AT

BLACK IRON			copper
galv. iron			zinc
corrugated iron			monel metal
rivets bolts			brass bronze
cleats			
solder flux			
ridging			
siding			
welding			
Ventilator			
Fan			
rheostat			
connections			
dampers rods			
hangers			
			Material
			Labor
			Net Cost
			Overhead
			Gross Cost
			Profit
			Sales Price


No.____ HEATING ••• Estimate Date

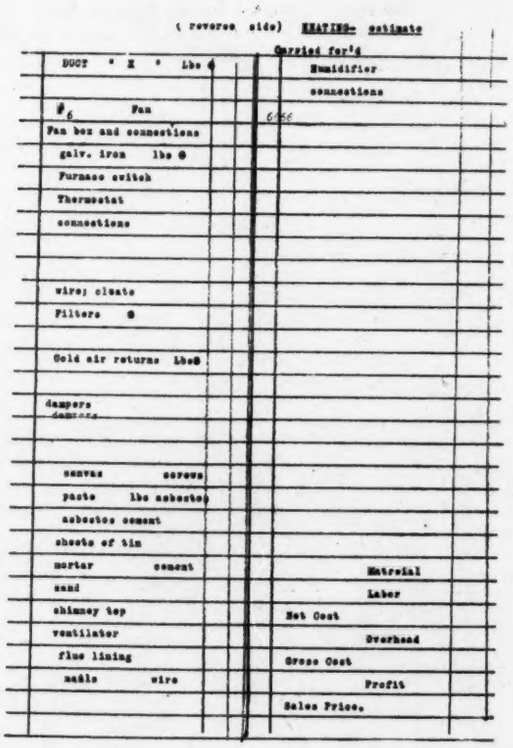
FOR_____ Telephone_____

Address_____ Mr. _____

WORK AT

1	" " Furnace "grate	ft. "X " stack	
	bonnet and casings		
	galv. iron lbs.@		
	bonnet collars	fittings	
	galv. flue pipe		
	Tee damper	dampers H.A.	
	elbows		
	cement mortar		
	bolts	"X " registers	
	inner lining tin		
	blk. iron		
	lbs. asbestos paper		
	HEAT PIPES		
	Ft. " rd. @		
		"X " grills	
	elbows		
		lbs. pipe covering	
		paste bands	
		safety thimbles	
	ft. "X " check	dust "X "	
		OVER OVER	

Here is another heating sheet designed especially for making estimates. Note that plenty of space has been left so you can fill in all details about each item. This is important in estimating for every contingency should be counted and provision for trouble made


(reverse side) HEATING- estimate

Carried for'd

DUCT " X " Lbs @	Humidifier
	connections
Fan	
Fan box and connections	
galv. iron lbs @	
Furnace switch	
Thermostat	
connections	
wire; cleats	
Filters @	
Cold air returns Lbs@	
dampers	
canvas screws	
paste lbs asbestos	
asbestos cement	
sheets of tin	
mortar cement	Material
sand	Labor
chimney top	Net Cost
ventilator	Overhead
flue lining	Gross Cost
nails wire	Profit
	Sales Price.

that the shop not so organized cannot compete until it also becomes modern?

Too many of the average shops make that mistake, and expect to gain over night the results obtained from long experience, good judgment and sound methods.

For the average shop, without this experience, to base estimates on volume can only mean loss. Those shops which depend and estimate on volume have built to that point and it took time, extra trouble and financing which must be gained through experience. Much is said about volume today, but the average shop should not mistake volume for shop capacity, which is quite another matter. The volume shop has its troubles, and if it is successful it learns to know its own costs, and then SELL the job at a profit. Its prestige and experience stand it in good stead and help it considerably, but this was not gained in a day.

What are the most important items of an estimate?

1. Cost of material, from previous experience in correct measuring and an allowance for waste.

2. Cost of labor, according to previous jobs of a like nature.

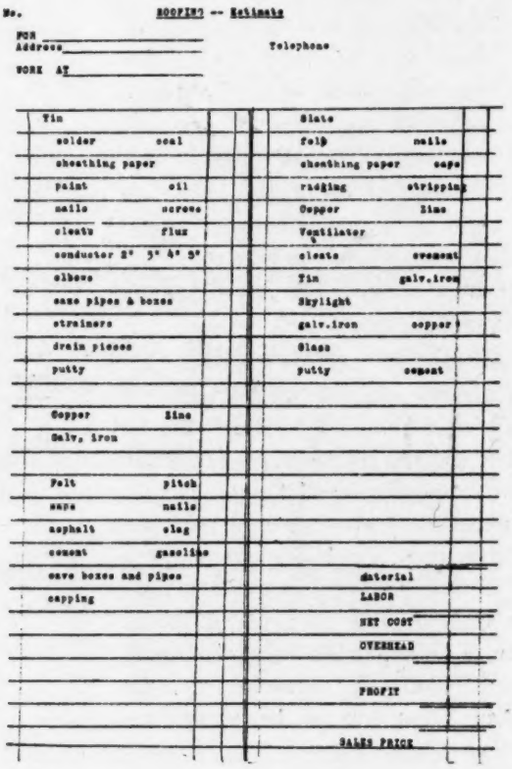
3. Cost of overhead, taken from the books and records of previous years.

And the next important need in the average shop, or any shop in fact, is the uniform estimating blank. This record becomes a permanent record, whether the job is won or lost.

The average shop in our trades has taken but three classes of work.

1. Roofing.
2. Sheet metal work.
3. Heating.

Each estimate in each class is made up of a number of detailed items and all or nearly all are necessary for the execution of the job.


No. ROOFING -- Estimate

FOR _____

Address_____ Telephone

WORK AT_____

Tin	Slate
solder coal	felt nails
sheathing paper	sheathing paper caps
paint oil	ridging stripping
nails screws	Copper Zinc
cleats flux	Ventilator
conductor 2" 3" 4" 5"	cleats cement
elbows	Tin galv.iron
cane pipes & boxes	Skylight
strainers	galv.iron copper
drain pieces	Glass
putty	putty cement
Copper Zinc	
Galv. iron	
Felt pitch	
caps nails	
asphalt slag	
cement gasoline	
cave boxes and pipes	aterial
capping	LABOR
	NET COST
	OVERHEAD
	PROFIT
	SALES PRICE

The roofing sheet has quite a number of items, but each one is important. Note that on this and all the other sheets space is provided at the end to fill in your Overhead. You've got Overhead and on the estimate sheet is the place to figure it into the jobs you are going after

No.	Date	Location	Submitted to	Phone	Address	Kind Work	File	Award	Amount
1	12-30	1613 Walnut	J. B. King	Wal. 6125	729 Sansom	R	W	√	$120.00
2	12-10	2010 N. 19th	S. T. John	Main 6120	2010 N. 19th	S	N	√	410.00
3	12-16	787 N. 63rd	W. C. Taylor	Mar. 2110	787 N. 63rd	H	S		786.00
4	12-13	605 N. 26th	T. S. Cowden	Ever. 1220	1120 Wood	H	T	√	210.00
5	11-5	2737 Glenwood	J. T. Simon	Main 8612	2656 Glen	S	G	×	461.00
6	10-1	6179 68th	C. S. Wilson	Wal. 2626	14 Broad	S	S	√	71.00

This is a typical estimate register sheet for an estimate ledger book. The important thing is that all information about the party wanting the estimate is on the sheet. Using this you know all about your prespect. These sheets are filed in a binder and kept for reference and also for checking when you get another job like one listed

Unless the estimator has before him, when estimating, all these items to remind him, he is likely to omit some of them. And when just a few are omitted in a number of estimates in one year, considerable money is lost.

The estimator in a large shop usually estimates only, but in the average shop the "boss" is the estimator. With many other matters on his mind the copies of estimating sheets submitted herewith will prove very helpful to him, as they have done in the past where used.

With these sheets the girl in the office can be of assistance. She can insert the prices, which are kept in a loose leaf book and recorded in unit and quantity prices from the bills received in the office. With a little training this assistance has been found profitable.

Each one of these blanks are self explanatory, yet it must be remembered that when adopted into a shop, other items perculiar to that shop's work may be added.

These estimate blanks can be printed or mimeographed very plainly at a very reasonable figure. BUT THEY SHOULD BE ALL ONE SIZE FOR PROPER FILING.

Letter size is recommended. The reverse side may be used for additional items or explanations.

All estimates should be numbered consecutively, no matter what the class may be. This is explained in the Estimate Register.

The estimate register shows the number of the estimate, which prevents an estimate from being mislaid or forgotten; the name and address of the owner; the location of the work; the kind of work: "R" roofing; "S" sheet metal work; "H" heating; the person to see or question concerning the work; the telephone number; the check or date of award; and the sales price.

This register sheet can be kept in a hard-back, loose leaf binder, and laid on the "boss's" desk for his daily inspection. It acts as a reminder "where to get a job," ready to "follow up" with the right person, by telephone, letter or personal call.

In one shop five estimates, amounting to over $4,000 were awarded through this register in one month this year, by opening up the subject that had been laid aside by the owners and allowing the contractor a chance for further explanation and sales effort.

This register is a reference list of estimates; a source for further solicitation; a list of new names for the mailing list; tells whether won or lost; and gives a chance to compare the amount of estimates won, with the total estimates each month or year. It is invaluable for the average shop owner with limited time to spend on office work.

A later article will show actual jobs, estimated upon, awarded and compared with the job cost records.

Oil Burner Sales Increase in 1930

IF any proof is needed that the buying power of the American home owner is still strong in spite of the depression of the past 15 months, it is provided in the fact that the oil heating industry has just closed the most active year in its history is the assertion of Walter F. Tant, president, American Oil Burner Association. Since this industry pretty well reflects the purchasing power of the people who own their own homes, this record must stand as a fair indication of the strength and soundness of home owning citizens.

Had the sales of domestic oil burners only equalled those of 1929, it would have been remarkable in view of the prevailing conditions and if they had fallen behin the 1929 total it would not have been surprising. But the fact that sales in 1930 were approximately 2 per cent ahead of the previous year is a direct challenge to those gloomier business prophets who think and speak only in terms of a downward trend.

At the end of 1929 statisticians predicted that by the end of the current year there would be 650,000 domestic oil burners installed in American homes. This estimate was arrived at after the prevailing depression was more than three months old and after many prominent industrialists had predicted an

(Continued on page 36)

Three-Piece Transition Fitting Rectangle to Round

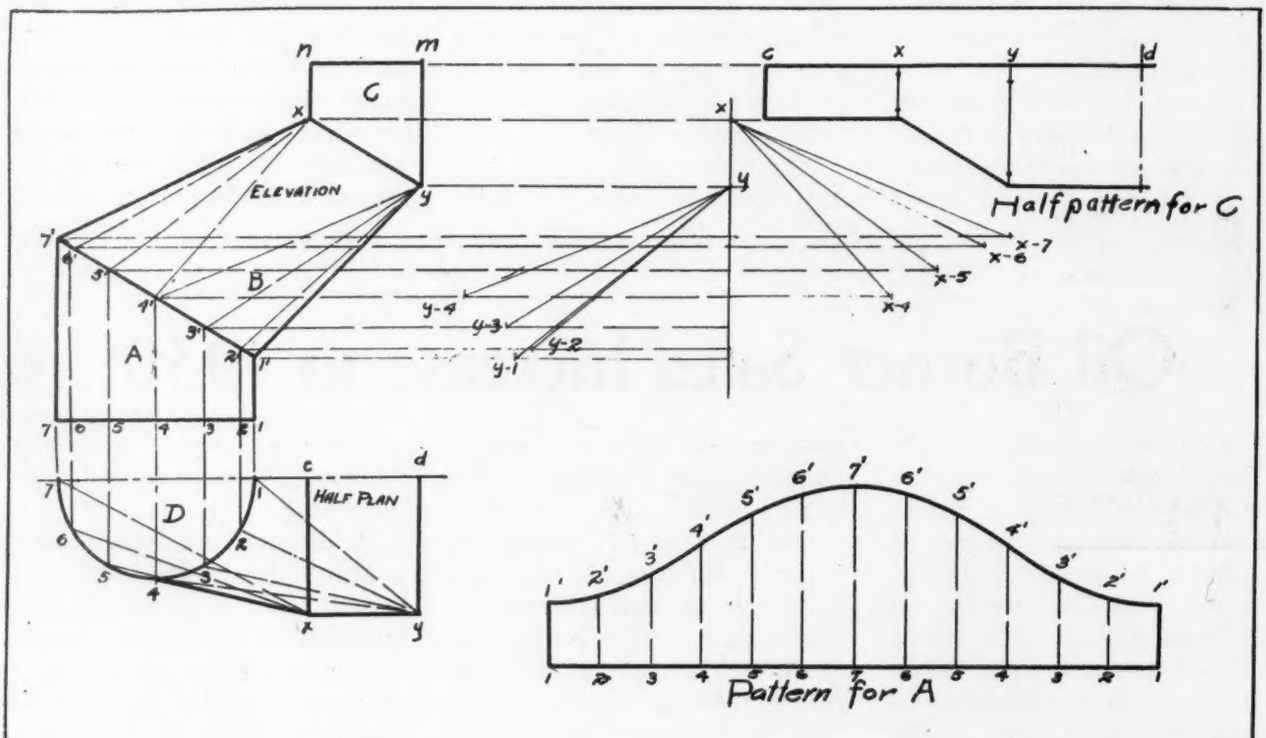
By L. F. HYATT
Contributing Editor

THE accompanying illustration shows a three-piece transition fitting often used in sheet metal work.

First draw the two center lines 7-d and 4'-4 of indefinite length. With the intersection of these two lines as a center draw the half circle representing the half profile of the round opening of the fitting. Divide this half circle into six equal spaces and number as shown. The offset may be made any desired distance and at any angle, in this case the line 1'-y is made on a 45 degree angle. From *y* erect a prependicular line the length desired. Now draw the miter lines of an indefinite length and draw the perpendicular lines from each of the spaces previously located on the half circle, so as to intersect the miter line. Draw the line m-n of an indefinite length and step off the width of the rectangular opening, locating the points m-n as shown. Drop a line from *n* intersecting the miter line x y. Connect points x and 7'. Next draw lines as shown from points x and y to the various points 1', 2', 3', 4', 5', 6' and 7 on the miter line 1'-7'. This completes the elevation.

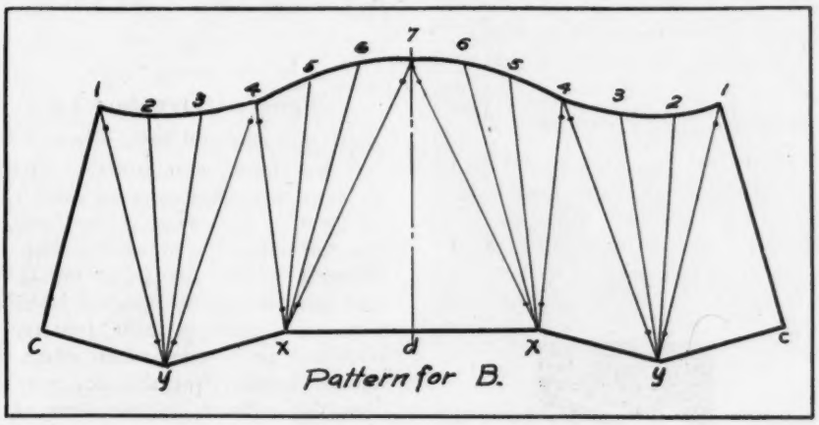
Now drop lines from points *m* and *n* intersecting line 7-d, and on these two lines step off a distance equal to one-half of the length of the long side of the rectangular opening. Letter these points c-x and d-y, and connect x and y. Draw lines from the points x and y to the various points on the half circle, thus completing the half plan of the fitting.

The true length of the lines on part B must now be obtained. First draw the horizontal lines from points x, y and all the points on 1' to 7'. Next draw a vertical line far enough from the elevation to allow room for the true length lines. Letter the points of intersection of the vertical line and the lines coming from points x and y, x and y. From the vertical line step off on the horizontal line from point 1' on the elevation the distance y to 1 found on the half plan and draw a line from this point to point y. In the same manner take the distance 2 to y found on the half plan and from the vertical line step off the distance on the horizontal line



THREE PIECE TRANSITION FITTING, RECTANGLE TO ROUND.

drawn from point 2 on the elevation. Draw a line from this point to point y as before. Continue in this way with the other points up to and including point 4, completing the first group of lines. Now from the half plan take the distance x-4 and step off this distance on the horizontal line drawn from 4 locating point x-4, and draw a line from x-4 to x. This is the true length of the line x-4 found on the half plan. Next take the distance x-5 found on the plan and step it off on the horizontal line drawn from point 5 locating x-5, and then draw the line as before. Continue with this group of lines until it is completed. The



Pattern for B.

lines used for the other half of this pattern are of course the same as the two groups of lines just completed.

To obtain the pattern for part C, horizontal lines are drawn from m, x and y. On the upper line of the three spaces are stepped off equal to the spaces c to x, x to y and y to d, found on the half plan. The points are lettered as shown on the half pattern for C. From each of these points lines are drawn intersecting a line drawn from a like letter on the elevation. Straight lines are now drawn connecting these points, thus completing the half pattern for C.

To begin the development of the pattern for A, a line of indefinite length is drawn. Upon this line spaces equal in length to the spaces on the half circle on the half plan are stepped off and perpendicular lines of indefinite length are drawn and numbered as shown on pattern for A. From the elevation take the distance 1 to 1′ and step this off on the vertical lines drawn from points 1 on the pattern for A. Next take the distance 2-2′ and step it off on the vertical lines from points 2 on the pattern for A. Continue with 3 to 3′, 4 to 4′, etc., after which the curved line describing the top of pattern A is drawn through the located points.

Now the pattern for B of the elevation may be drawn. First draw the center line 7-d of an indefinite length. On this line step off the distance x-1′ found on the elevation and letter these points 7-d as shown on the pattern for B. Through point *d* draw a horizontal line of indefinite length and on each side of the vertical center line step off the distance c-x found on the half plan. This distance is of course one-half of the long side of the rectangular opening. Letter these points x and connect with point 7, thus completing the first triangle of the pattern for B. Now from the x group of the true length lines take the distance x to x-6 and with x on pattern B as a center strike arcs intersecting the arcs just drawn and locating points 6. Continue with the other lines of this group up to and including line x-4. Be sure to take the length for the short arcs from the points 1′, 2′, 3′ on the curved side of pattern A as was done with the distance 7-6 on pattern B. Next with x as a center and x to y found on the elevation as a radius strike arcs of indefinite length. Now from the y group of lines take the distance y to y-4 as a radius and 4 on pattern B as a center and strike arcs intersecting the arcs previously drawn locating points y on pattern B. Take the distance y to y-3 found on the y group of lines and y on pattern B as centers and strike arcs as before. Now with the instruments set the distance 4′ to 3′ on pattern A and 4 on pattern B as centers, strike arcs intersecting the arcs just drawn and locating points 3 on pattern B. Continue with the other true length lines in the y group. Now with the distance c-x found on the half plan and y on the pattern as a center, again strike arcs of indefinite length. Then take the distance from 1′ to y, found on the elevation, which is the true length of the seam line, and with 1 as centers strike arcs intersecting the arc just drawn, locating points C. Draw lines connecting these points, also the curved line through the points of intersection of the long and short arcs. The seams are now added, completing the patterns.

Let's Make Some Money

Beginning with this issue, Benjamin F. John is going to give us a number of articles under the general heading—Let's Make Some Money. The idea behind these articles is that there are many ways in which money can be made if only we are alert to see and take advantage of them. Mr. John is not a novice. He has been in this industry for more than 35 years. His work with the Philadelphia associatons has been advertised all over the East. Now he is going to take the lid off this experience and give us practcal ideas whereby we all can make some money.

MERCHANDISING ALMANAC

Week of August 24

OFTEN the best way to get a good day's work out of the gang in times of stress is to roll up your sleeves and help—literally lead them. As a steady diet, however, this is not profitable. If your shop won't run as smoothly when you are away, if the jobs won't be installed right unless you are there to show them how, there is something wrong with your management. You can't be out getting jobs to keep the crew busy, laying out difficult problems, planning, thinking and work in the shop too. You can't be both engineer and pilot.

•

Week of August 31

WHAT kind of a prospect list have you got? If you haven't got one better start in right now! First of all go over the books and list all of the heating plants you've installed as far back as you can go. Record on convenient sized cards all the data you can reconstruct—type and size of plant, when installed, date and nature of repairs, when cleaned, etc. Such a list is a veritable gold mine. Call on every one of them and if you can't think of any better approach, just ask them how the old plant is getting along. You may get thrown out of a lot of places, but you will get some business, too.

•

Week of September 7

YOU don't expect your salesmen to guarantee in advance how many jobs they will sell. You do expect them to do a good job of creative selling, and if they do such a job their efforts are sure to bear fruit. Expect the same thing and no more of your advertising. Like your salesmen, your advertisements will make many a wasted call, but it's up to you to see that they do a good job of creative selling.

Week of September 14

DO you as a regular practice follow up every customer you sell? If you do the kind of work you should do, it will pay you to do this, as satisfied customers are eager to recommend your work to their friends. Many will do this voluntarily, but don't wait for them. After inquiring as to how the plant is satisfying, take down the names of friends who expressed surprise at the small amount of fuel being consumed, who marveled at the even distribution of heat—even in the sun room which was formerly cold. Note, too, those who were interested in the humidifying system.

•

Week of September 21

HOW are the homes heated in the 300 block on Second Street? How many are warm-air? How many are efficient? It will take you but an hour or so to find out and 10 to 1 you will run into a chance at a repair or replacement job while finding out. Then maybe you will get curious about the houses in the 400 block on Third Street and the 500 block on Fourth Street, and so on. Try it! Well, try it again, do it systematically, and put your heart into it.

•

Week of September 28

SOMETIMES a "dirty-little-one-horse shop" turns out the biggest volume of first class work, but not BECAUSE it is dirty and one-horse. Clean up and make your shop look like you were going somewhere. You can never tell when you are being judged falsely by a chance visitor.

Week of October 5

YOU can't hope to stay in business and make a proper compensation for your time and investment unless you keep accurate cost records. You can't properly price a job unless you know how much it will cost. How can you sell it effectively unless you know its value? Start keeping cost records today and see that every cost item—labor, material and overhead—plus a good profit is included in your price on every job. Never mind about volume. Sell at the right price and volume will take care of itself. I said SELL.

•

Week of October 12

ON that sale you hope to make today—leave your furnace catalog at home and make up your mind not to mention the name of the furnace you sell unless the prospect insists on knowing. Talk only about the comfort provided by the kind of installation you propose to make, talk about humidity, air motion and its effect on the occupants. Not that the reputation that attaches to the name of a furnace isn't sometimes an asset, but is isn't the main thing you have to sell. So forget about it just for today. It will be good practice in selling air conditioning.

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Week of October 19

ARE you making money? If not, why not? You cannot possibly answer this question unless you have a cost accounting system that enables you to determine your cost on every job—labor, materials and overhead. You can't remedy the trouble unless you know exactly where and what it is. No, don't blame your trouble on competition, business conditions or any other external factor! You cannot progress until you can base your progress on facts.

Stop——Look——Enter!

SHOW windows are one of the first things by which the public judges your shop.

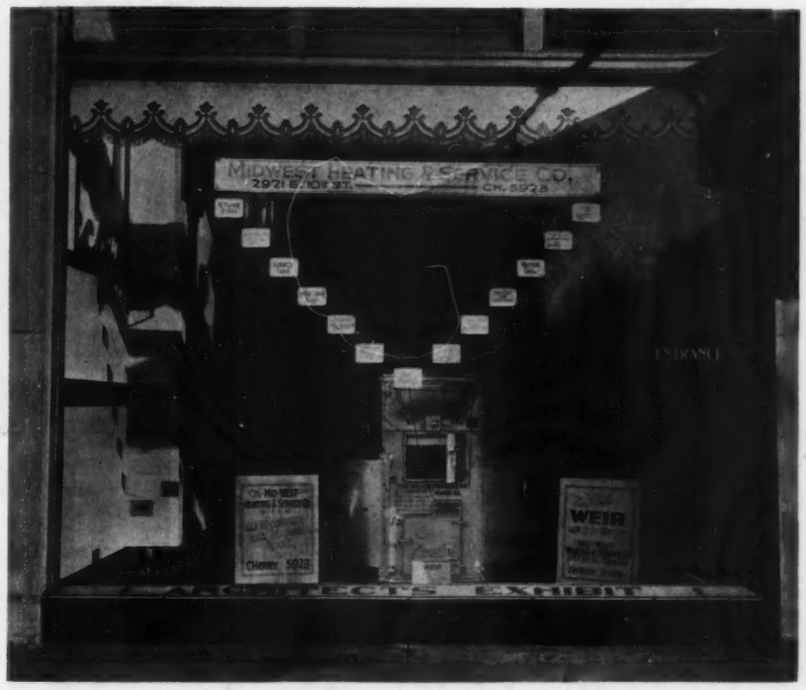
Frequently they are the last thing you are judged by. Especially when your windows are unwashed, unattractive and cluttered up with a lot of cast off elbows, furnace fittings, and odds and ends which give the public the impression that you are running a junk yard and not a heating or sheet metal establish-

It is no more difficult to make your windows attractive than it is to give your truck a coat of paint and a weekly wash. Hundreds of heating and sheet metal men have found that their window can be made to pay real, honest-to-goodness profits when it is put to work.

The window shown here was designed and trimmed by the Mid-West Heating and Service Company in Indianapolis, Indiana.

In this particular display a steel furnace is shown and by the use of stickers and ribbons every talking point on the furnace is brought out for public attention and study. This form of window trim is not new. You probably have stopped and studied similar ones countless times.

Window displays are one of the most profitable advertising methods of other businesses. Good looking windows should also be one of our means to get the public to Stop, Look and Enter.



Garages—A Source of Sales and Profit

THE live sheet metal contractor must always be on the lookout for new ideas or new products to make and sell if he is to keep ahead of the other fellow in getting the profits.

And equally important is the fact that when these products are made they must be sold. This means that the product must be saleable as well as serviceable.

The two small illustrations show a unique sheet metal garage designed and sold by the P. H. Cotton Sheet Metal Works of New Orleans. This progressive firm is continually bringing out new products which they make up in their own shop and sell.

Here are the high lights of this product. The garage is 9½ by 18 feet in area and is portable. By

portable is meant that the building can be taken apart and moved to another location if necessary.

The roof is single pitch with a false front built up to hide the roof. The side walls are 8 feet high on one side and 9 feet high on the other side so that if the garage is put up alongside another building rain is carried across the roof and will not fall on the back side or down the car door.

The side walls and roof sheets are 26 gauge corrugated iron with interlocking seams. The doors are paneled in form and are made of 26 gauge flat galvanized iron fitted around the wood framing.

The frame of the building is composed of 1½ by 2 by ⅛-inch steel angles painted. All bolts, hinges and hardware are galvanized for water protection. The hinges are 8-inch extra heavy to prevent sagging. The pins for the hinges are all brass to eliminate rusting.

The church is a small frame building standing on an exposed site. The heat loss is high due to the light construction, many windows and low, uninsulated roof

A Furnace-Oil Burner Unit in a Small Frame Church

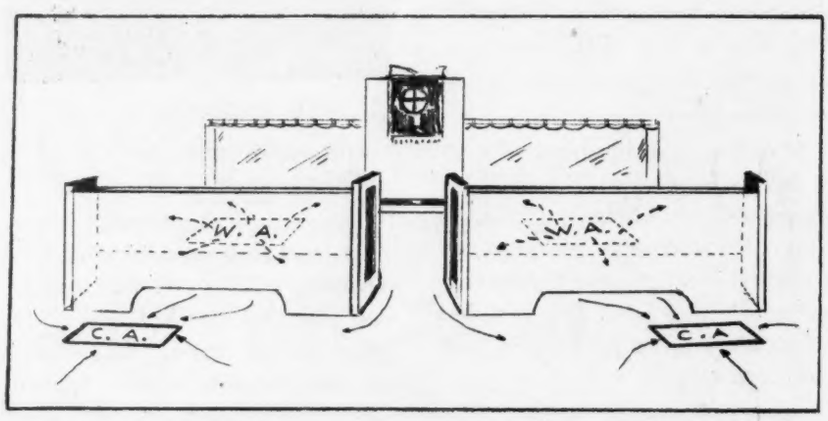
E. J. ZIENER, sheet metal and warm air heating contractor of Rockford, Illinois, is one of the old timers who has taken modern methods and equipment and made them work for him.

Years ago Mr. Ziener traveled for several furnace manufacturers. His activity within the warm air heating field dates back to that period when pit installations, twice sized furnaces, and pipeless wonders were taking the country by storm. Some years ago he retired from the road and went into a general heating and sheet metal business in Rockford. One thing he determined to do. That was to look into every development which came along and where possible put that development to use.

Because of this determination to adopt modern methods he is now one of the established contractors installing oil burners in furnaces. He sells and installs fan and blower jobs and makes modern warm air heating principles a basic part of all his selling effort.

In this effort he has been very successful. Scattered all over his home town are examples of his method of selling and erecting modern heating plants. Not only in residences, but in churches and small public buildings his work and sales are in evidence.

One of the most interesting small jobs he has recently completed is a new heating plant in the St. Williams Church. This church is a very small parish church on the outskirts

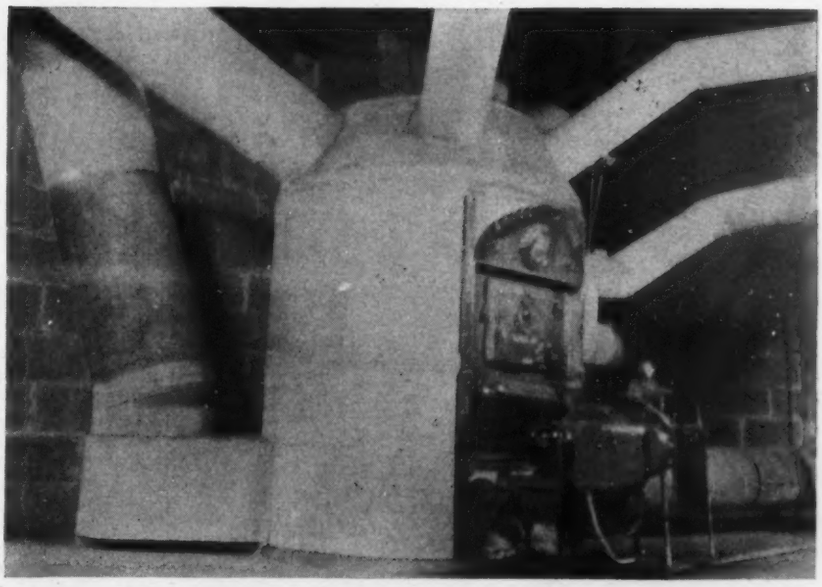


The previous system failed principally because air flow from the warm air registers and into the return air grilles was hindered by the tight seat backs. In order to get good air flow the backs were cut out as shown here

of Rockford. It is typical of thousands of similar structures where the live heating man can find a waiting field for his selling efforts.

The church is a small frame building, standing on an exposed site with wide open spaces where for the wind to play havoc on cold days. The building is not particularly well insulated, especially from the standpoint of weather tightness. And in the winter time, keeping the church warm on cold days after the building has stood unheated for days at a time means that the heating plant has to do its stuff quickly and well.

When the church was built a warm air heating plant was installed. Price must have been of much importance for the original system did little else but direct some warm air into portions of the interior. Most of the interior went unheated. And to make matters worse, it was almost impossible to get heat up on a cold Sunday morning in time for the early masses.

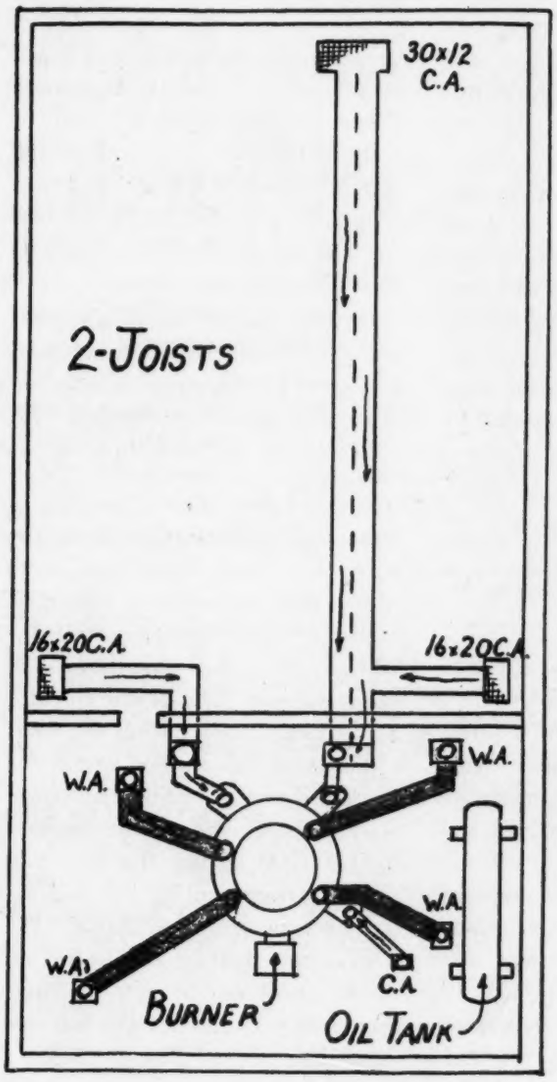


This year the parishioners determined to have heating comfort. The heating men were called in and their suggestions were considered. Mr. Ziener laid out a heating system in which several radical changes from the old plant were made, particularly in the matter of handling return air.

The most radical change was his recommendation to install an oil burner in the new furnace and his statement that with adequate control the burner and the furnace would heat the building quickly and keep all parts of the interior warm regardless of what the weather outside was doing.

The contract was awarded to include all the changes recommended. The old furnace was taken out and most of the old leaders taken down. The revamped system works on the principle of introducing plenty of warm air at the front of the interior and taking as much cold air as possible out from the rear. As shown on the plan, the furnace has just four large warm air leaders. These are divided so that two of them feed air to the very front of the church and the other two open through the floor immediately in front of the first row of pews and ahead of the alter railing.

The return air system is based around three main floor grilles. Two small ones open through the floor at a point between the first and second rows of pews and at the outside walls of the church. The large, third outlet is a floor grille at the



Above—Only four warm air leads were taken off the furnace. Return air is brought in by three leads. The high basement gave plenty of pitch for the pipes. The Kleenheat burner operates through the ashpit door into a special fire brick firing chamber

Left—This shows the layout of the revamped system. The return air system is designed around one long, large run and two smaller ones. The warm air leads are all short and equally spaced around the bonnet and through the altar end of the church

The long return air duct is built of two 1 by 12 inch planks capped top and bottom with galvanized iron. The duct is suspended by wood nailing strips from the floor joists. This duct brings cold air from the front door vestibule and from the front of the church

front door. This serves two purposes. It takes care of the cold air admitted when the door is opened and also helps direct the warm air from the front of the church to the rear.

One of the sketches shows how the registers and grilles at the front of the auditorium were handled. All four of these openings were a part of the old installation, but because the back of the pews in the front row extended down tight to the floor there was little possibility of the air getting into the return air grilles.

The remedy for this was to cut out the back of the pew. This was done as shown and since that operation both the warm air registers and the grilles have worked perfectly. Moving air has a chance to flow directly out of or into the openings and begin to move throughout the interior.

The long return air run from the front door is carried through a board and sheet duct hung from the floor joists. The sides of this duct are 1 by 12 boards. Across the top and bottom, closing in the box is galvanized iron. The duct is suspended by wood nailing strips as shown.

One of the front return airs empties into the long duct. Tests show that this arrangement works without interference and that as a matter of fact the small duct acts somewhat like a jet accelerator for the long run. This run is 36 feet long.

Since the plant has been in operation this winter the combination of oil burner and furnace has proved every statement the contractor made in his sales talk. The combination gets heat up into the auditorium quickly and controls that temperature without any manual attention as long as necessary. Whereas a janitor was required for early firing with the old plant and in bitter weather enough heat was frequently uncertain, with the new combination weather has little to do with the inside temperature.

Because all the warm air leads are comparatively short no thought was given to making the installation other than a good gravity job.

A COPPER CHURCH ROOF

(Continued from page 13)

There are no downspouts visible on the outside of the building. All drainage is cared for through leaders which are concealed within the walls.

Provision has been made to light the tower at night through floodlights placed on the parapet of the masonry tower. The copper of the tower was treated so that the copper retains a dull color. This color dominates the color scheme of the entire building. In addition, the tower is of such large size and is designed in such a striking manner that this copper tower is one of the outstanding architectural features of the churches of Cleveland.

OIL BURNER SALES

(Continued from page 29)

early upturn during the spring months. Consequently the estimate included an allowance for improved conditions. Actually, based on authentic information, there will be slightly more than 654,000 burners in use by the end of December, 1930. The sales for the year will be a little over 125,000 burners.

These 125,000 burners represent a total manufacturers' gross of more than $20,000,000. With the accessories and installation costs added they represent a consumer outlay of approximately $69,000,000, which is less than the 1929 dollar volume. This is due to price adjustments made during the year.

This total was reached despite the marked slump in building activities. Residential building alone declined $771,000,000 during the year and the total decline in all building activity was more than $1,260,000,000. This means that the market for oil burners provided by new buildings and modernized homes was just this much less in 1930 than in 1929.

LET'S FIGHT IT OUT NOW

(Continued from page 21)

This boss of mine used to go right out and get the owner, the architect and the contractor together and tell them, "Now there are some things we have got to settle before I go ahead and we might just as well get them over with today. You, Mr. Contractor, want this warm air pipe run here so that it won't interfere with that partition. You, Mr. Architect, would like me to set the furnace over in that corner so that it will be out of the way. Now I want to say that I can't put in a good heating plant if I have to meet your wishes.

"If I am going to have trouble with you over the way the plant heats, I'd rather fight it out now than after I have my materials, labor and profit tied up in the job."

That boss operated more than 30 years ago, but I don't believe any heating man now working can improve on his method of avoiding trouble.

A lot of trouble is experienced in handling the return air side of the heating system. It never does to use figures all by themselves. In my case I sidestep the figures, for while figures don't lie, liers often figure. The thing to do is to sit down and study out the air movement within the house. Most of us know that the warm air is going to go from here to there and that the return air is probably going to act thus and so.

One of the best things I have found is the idea of keeping the warm air currents out of the return air currents. If we judge the return air currents correctly we can locate our grilles so that the air drops into the furnace through a natural path of travel. And if the warm air is kept out of this current there will be no reason for conflicting currents getting all tangled up and causing floor drafts, cold rooms, too hot corners, etc.

If the cold air currents are properly judged, the basement pipes can be assembled and figured for size according to the amount of either warm or cold air we are going to handle. It is easy enough to place a cold air return large enough to handle the return air movement in a certain part of the house, if we know what the amount of that return air is.

Taking care of the windward side of the house and the stair hall first eliminates a lot of worry. These two spots are the chief sources of cold return air. If the hall duct is large enough to accommodate all the return air of the hall and of the upstairs, if there is no second floor return air system, the cold hall is pushed out of the picture.

Someone in the ARTISAN a short time ago said, "Never place the return air grille in a corner." That's sound advice. Leave it out in the open where it can get air from all sides and its efficiency is increased considerably, I believe. Of course we are all trying to keep both the warm and cold air runs as short as possible on gravity. But we depart somewhat from usual by pitching all return air pipes toward the furnace. The warm air pipes we run upward at a sharp angle right off the bonnet and run all pipe the same height 24 inches from the bonnet.

Most of us are designing and building pretty efficient heating plants. Most of us know what the Standard Code is and we make use of it in designing.

But one thing we ought all do is follow the method of that old-time boss of mine and tackle trouble just as soon as possible. It isn't often that we don't have to fight over some detail. Trying to sidestep the argument hoping that the owner will be satisfied is a poor way to prepare the way for collecting our money. If all the difficulties are ironed out before we go to work, the owner can have no reason for withholding payment after our work is done.

If we have got to fight—let's make it a rule to fight before we have our material, labor and profit tied up in the job.

CORRUGATED IRON SHED

(Continued from page 25)

"Cotton-seed exerts a lateral pressure against the sides of the building in which it is stored, consequently we build walls and roofs both of sheet metal in the manner shown. The storehouses are loaded by an overhead conveyor which picks up the material from trucks or cars and runs through the sheet-metal louvre, discharging the seed by gravity into piles. The buildings are designed to conform to the 'angle of repose' of the piled seed so that there is no pressure anywhere on the walls of the building. Down through the center of the building, at grade level, there is a screw conveyor which discharges the seed to the mill where the oil is expressed. After which our by-products are likewise stored to await shipment."

A somewhat more costly method of framing, and a favorite one in foreign countries is to set 3x4-inch studs (3 feet on centers) OUTSIDE the wall of the building. The corrugated sheets are then nailed HORIZONTALLY on the inside with a lap of about a groove and a half. If this framing is set up on a concrete foundation it will resist a tremendous lateral pressure from stored materials. Not only cotton and its seed, but grain of all kinds, cement in sacks and even loose coal may be safely stored by this method. Along the railways of Africa, for example, may be seen hundreds of such buildings erected 30 to 50 years ago and still doing duty.

Corrugated sheets are admirably adapted to buildings where speed of erection, fire-resistance and economy are considerations. They have the advantage, too, of portability, for corrugated sheets have a high salvage value and can be wrecked or moved rapidly.

Some Further Explanation For Overton's Factory Heating Article

THE article on Factory Heating, which appeared October 11, certainly stirred up some comment. Some parts of the text were evidently a little strong, but from the comment, the article went over big. Here is a letter which a reader sent in and which brings up a point which can well afford additional explanation. The reader said:

Mr. P. Overton,
Care AMERICAN ARTISAN,
Chicago, Ill.

Dear Mr. Overton:

I have read carefully your article appearing in ARTISAN of October 11 and some points are not clear to me, in that I cannot figure how you arrive at some conclusions.

Will you please tell me how you use 79.52 as a mean inside temperature, or probably I should say *why*, and also what the figures 0.017 and 8 are derived from?

I have been taught that the inside floor temperature, if the breathing line is 70, would be about 60, making the temperature difference, with ground temperature of 30, just 30 degrees, where you use 49.52.

In only one case do your constants agree with any I have, and in fact no two sets which I have agree.

It would seem to me that this matter of constants should be pretty well established by now, and that there could be no such thing as a difference of opinion in the heat loss through such standard materials as brick, glass, concrete, or wood.

In item 19 you deduct, in this case, about one-third of the floor area from your calculations, so please tell me why this area is not figured?

I shall appreciate these data very much, and assure you I shall follow your ensuing articles very closely.

Sincerely trusting I am not imposing, I am,

Very truly,
[Signed] George C. Jordan.

Platte Overton

How to Figure the Mean Temperature

In response to this request Mr. Overton answered as follows:

Mr. George C. Jordan,
3149 Illinois Avenue,
Milwaukee, Wis.

Dear Mr. Jordan:

In reference to the mean temperature of 79.52 in the Factory Heating article in AMERICAN ARTISAN of October 11, you will note that this mean temperature merely gives us an average for the entire structure. The room temperature at the floor line would be about 60 degrees, but directly under the roof joists at the highest place in the room the temperature will average about 90 degrees.

Theoretically, we should calculate separately every 3 or 4 feet of wall and glass perpendicularly, but our mean temperature will give us the same final answer, approximately.

The formula for determining the mean temperature was taken from Prof. Rietschel's

$$t_m = [(H-10)0.017+1]t_r$$

where t_m = mean temperature, t_r = room temperature to be maintained, and H = average ceiling height.

Regarding item 19, only the floors within 10 feet of the outside walls are considered. The temperature of 30 degrees is again an average, as there will be a variation in every foot inward.

One might take the entire floor area into consideration, and the constant of 30 degrees would be raised to a possible 40 or 45 degrees. Again, the answer would be the same, approximately.

I do not believe there is a very wide variation in the constants or K's for heat loss, as the laboratories and authorities have about agreed on a standard, but of course tests have been made in still air, and wind effects will vary these coefficients. On my data sheet item 18 compensates for wind and exposure.

There are a thousand points of interest in connection with these various items over which engineers could spend hours of discussion. They are of no particular interest or value to the average warm air contractor who is looking for information regarding basic principles that will assist him in installing successful jobs.

To the engineer who wishes to discuss these items we are pleased to answer all questions by mail.

We thank you for your interesting letter. Please write us again.

One of the principle reasons for running this series is to get your readers to ask questions. You have been talking about technical features, but do you understand them? If there is anything you don't understand or want more information about—write us your questions. Part of Mr. Overton's service with this series is to answer these questions. Make use of it.

Here is another letter which brings up this point about the inside mean temperature again, but also asks for information on some additional points which will be of interest. This writer says:

Give Us More Information on Flue Sizes and Floor Heat Loss

Dear Mr. Wilder:

I want to write a few comments on the article by Platte Overton, "Factory Heating."

I cannot praise such articles enough, as it is articles of this type that go to make "air conditioners" out of us furnace men.

Far be it from the writer to voice a "knock" about anything, unless it be in the form of constructive criticism or something which will help the industry, so here goes. Frankly, I have read the "Factory Heating" article twice already, and have found three or four items that are still "sailing" over my head, but instead of condemning the article, I am shaking myself and have set out to educate myself on the items I do not understand.

Specifically, why subtract 10 from the ceiling height to get the mean temperature? Several other unexplained figures in the same paragraph are above my head, but I'll bet I know their meaning before the week is up.

From item 19, I take it that the heat loss through the 4-inch floor is figured for the 10 feet nearest the outside walls, only. I learned something new there. What happens in a garage where the doors are opened often, permitting cold air to blanket the entire floor?

I hope no one will ask me to figure a flue size before Mr. Overton has the opportunity of explaining how he found his flue size.

I never dreamed it took so much heat to evaporate water for our humidity. If I got nothing else out of the article but this information, the article has been a wonderful help to me.

To sum up the entire article, I would like, if I may, to suggest that nothing keep Mr. Overton from continuing his heating articles, but that he cover less ground in each article and explain all steps in detail, because the larger number of men would step to the phone and ask an explanation of one or two items, but they will not sit down and write a letter to gain the information.

It is the technically correct method of figuring that we need, and I want it more than anyone, and will not file this issue of the ARTISAN until I digest and understand all of Mr. Overton's article; as some time ago an article appeared in the ARTISAN where an engineer figured everything correct for a trunk line fan job in a home, and when winter came, one room was so overpiped that he had to keep the damper closed to that room because it was overheated. To me, that engineer was just as wrong as the man who figured too short; so, in closing, here's hoping Mr. Overton continues with his technically correct methods.

Yours respectfully,
[Signed] Arthur W. Hunt.

Floor Heat Loss and Flue Size Explained

Referring to the reply of Mr. Jordan and explaining the other points raised by Mr. Hunt, Mr. Overton says:

Relative to your letter of October 24 regarding items in article, "Factory Heating," in AMERICAN ARTISAN of October 11, 1930. The formula for determining the mean temperature of rooms with ceilings over 10 feet in height seems to have puzzled several readers, but I have explained this point more fully in my reply to George C. Jordan. The reply to Mr. Jordan precedes this answer on this page.

Regarding B.t.u. loss for floors, 30 degrees for ground temperature is an average for the 10 feet from the outside wall. As a matter of fact, the temperature will vary for every foot from the wall. If we consider the entire floor space in buildings as wide as the one under discussion, our temperature rise would possibly be 79.52 — 45 in place of 79.52 — 30, as our average ground temperature would be 45, approximately.

In reference to garages where doors are opened often, we would place this in item 9, and base it on the B.t.u. loss for heating the assumed c.f.m. entering for the time the floors are open. This item will be given space in a future article on "Garage Heating."

The Formulas Must Be Used with Reason

The size of the flue is based on the formula

$$S = .85 \times \frac{A}{\sqrt{H}}$$

where S=area of flue in square feet, A = area of grate in square feet, and H = height of flue above grate. Or

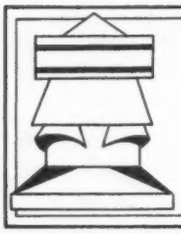
$$H = \frac{(.85 \times A)^2}{S^2}$$

The engineer (the writer) claims no credit for these various formulas. They were all figured out years ago. He has picked them from various textbooks and engineers' handbooks and collected them for these articles. However, he has used them in practice for years and knows by experience that they are correct. Engineers will differ somewhat on these items, but the final answers are generally the same, or approximately so.

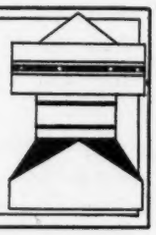
All the above formulas must be used with reason. The formula for the required size of height of flue does not justify a flue 10 feet in height, even if the area is large enough, nor would it be practical in Denver, 5,000 feet above sea level.

The formula for determining mean temperatures might in some cases work out showing a mean temperature in excess of the inlet temperature, which would be an impossibility. Here experience and reasoning are necessary. Engineers do not live by "formulas alone." If they did, many of their jobs would be failures. When the system to be designed is vast and intricate, the services of an engineer is recommended.

These articles are written, not in an attempt to make engineers of all furnace men, but to give him practical, basic principles by which he may design or estimate the required apparatus for heating, ventilating and air-conditioning in the average school, factory, church, lodge hall or theater. If you are not sure of yourself, consult an engineer.



GRAVITY EXHAUST VENTILATION



Make the Anemometer One of Your Selling Tools

By **PAUL R. JORDAN***

AN anemometer is simply an air meter. According to the dictionary, "an anemometer is a wind gauge; an instrument which indicates the *pressure* of the wind." I think that definition reverts back to the period when air current velocities within ducts were not a vital consideration, and outside wind velocities were; that period when the weather was the all important subject for discussion.

The manufacturer's catalog says, "Anemometers are used for measuring the *velocity* of air current in mines, tunnels, sewers, public buildings, hospitals, schools, etc." It looks as if these words might have been added one at a time as the uses developed for anemometers. Air currents in mines after outside winds were probably the first air currents to come under serious investigation. Sewers, public buildings and hospitals followed about in the order named, with schools coming last and eventually topping the entire list as to care and effort in investigation. The use of the anemometer as an adjunct in heating systems relates almost entirely to the warm air heating system. In this particular field, however, it has assumed a place of considerable importance.

My own interest in the anemometer is in its relationship to ventilating. However, the same instrument is used for ventilating as for heating investigation, and the same general rules apply for its application. The type of anemometer generally used for practical purposes on the job consists of a set of fan-blades installed inside a metal ring support, the fan being geared to indicator hands set in a clock-like face, which hands indicate the velocity of the air current passing through the ring and striking the fan blades. The fan is necessarily very sensitive and has jewel bearings. It should not be used in temperatures exceeding 300 degrees Farenheit. (See Fig. 1.)

The anemometer measures and records the velocity of an air current. Many uses can be found for this instrument by the heating and ventilating man. It can be made a part of the sales kit

You will note that I speak of the hands as indicating the air *velocity*. This type of anemometer does not indicate the air *pressure*. It has nothing to do with air pressures at all, but is concerned solely with air velocities. However, inasmuch as air velocities and air volumes are what the practical man on the job is interested in, this type of anemometer is entirely satisfactory.

For laboratory and investigation work, this ordinary type of anemometer is not accurate enough. It is, however, accurate enough for all practical purposes, especially if checked once in a while, and it has the distinct advantage of being always available and ready to go without setting up or other preparation; and with no more care than is given the average watch. In using the term anemometer, therefore, I refer to this practical type, the type which is in most general use.

The anemometer indicates velocities, but does not record them. The big hand travels around the dial once to indicate 100 feet of air travel through the instrument. The smaller hands are geared to record 1,000, 10,000, 100,000 and so on, but simply record the passage of that many feet. Velocity is of course the speed of the passage, so that in

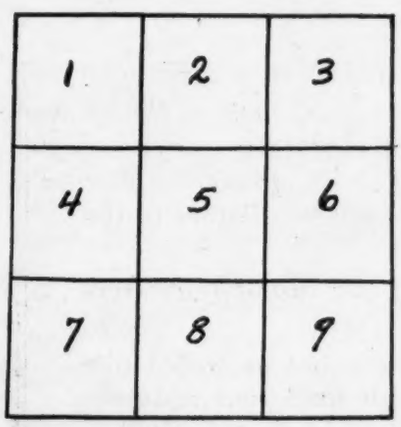
*The Paul R. Jordan Co., ventilator manufacturers, Indianapolis, Ind.

order to get velocities you either have to time the passage of a certain number of feet or else record the number of feet that pass during a certain time. That may sound a little involved, but it is not.

For instance, if you want to find out how long it takes the air current to flow 1000 feet, simply time your anemometer for 1000 feet. If on the other hand you want to find out how fast the air current is traveling in feet per minute, allow your anemometer to run for one minute, and there you have it.

It might be well to call attention to the fact that an anemometer does not indicate volume of air, it only indicates velocity. In other words, if an anemometer runs 500 feet per minute that does not mean 500 cubic feet per minute. In order to resolve it into cubic feet you must multiply it by the sectional area of the duct in square feet. For example, if you had a duct area of 72 square inches (½ square foot) and the anemometer run of 500 feet per minute, your volume of air discharge would be 250 cubic feet per minute. If on the other hand, this duct has a sectional area of 4 square feet (2 ft. x 2 ft.) and your anemometer run is 500 feet per minute, the air discharge is 2000 cubic feet per minute.

For convenience in operation, anemometers are equipped with an arrangement for engaging and releasing the gears on the fan wheels. The fan wheel revolves all of the time, but the gears are not meshed, and consequently the hands do not turn, excepting when the little lever is thrown over to "in." When the lever is thrown out, the fan wheel continues to turn but the hands stop. This arrangement serves the double purpose of allowing the wheel to get into momentum before starting the test, and of accurately starting and stopping your anemometer run to conform to the one minute or other time period used. The smaller recording dials allow you, if you so desire, to go away and leave the instrument running for minutes or hours at a time, and ascertain just what it has done by comparative readings.



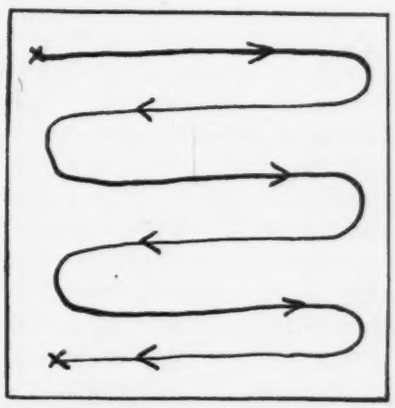
The most practical way to measure the velocity of air passing through a square opening is to divide the opening into nine equal sections. Then record the velocity of each section and strike your average

Among the later developments in anemometers are the zero setting arrangements. There are several different kinds of such arrangements, some better than others as to convenience, but they all accomplish the same thing; namely, the setting of the instrument back to zero without reversing it and waiting for it to run back. With the old type of instrument it was necessary to either allow it to run back or else make readings at the beginning and end of each test and subtract to get the anemometer run. With the setting of the anemometer back to zero before each test the arithmetic is eliminated, saving work and also eliminating that one chance of error.

The anemometer is not absolute in any sense. It usually is constructed to measure air velocities from 200 to 2,000 feet per minute with reasonable accuracy. It is calibrated for velocities from 200 to 1,000 feet per minute and is so regulated as to be accurate at 500 feet. For velocities over and under 500 feet the curve of correction must be used where accuracy is demanded. However, where a comparison of velocities is the element of interest, in other words, a balancing up of flues or a record of what one flue is doing in comparison with another flue, then the curve of correction (or calibration curve) may be neglected.

The above figures of course do not refer to low speed anemometers measuring say from 75 to 400 feet, or high speed anemometers measuring up to say 6,000 feet.

There are two factors which must be taken into consideration in measuring flue velocities. One of these factors is that of the varying air velocities at different points in the section of the flue. The other of these is the effect of register faces. In comparative tests these factors may be neglected, but where either the volume or the velocity of the air flow is wanted, they must be considered.



Some engineers traverse the face of the opening as shown here. This isa quicker but not so accurate a method

The best way to handle the problem of variable velocities at different sections of the flue is to start off by admitting that there is such variation. As a matter of fact, the variation is almost always there, but the degree of variation differs. Probably the most practical method of checking these variations against each other is to divide the flue face into nine sections, then run one test with the anemometer placed in the center of each section (see fig. 2). All up the total of the anemometer readings and divide by nine for an average.

For instance, suppose we had the following readings:

Space No. 1	450 ft.
Space No. 2	460 ft.
Space No. 3	448 ft.

Space No. 4	455 ft.
Space No. 5	465 ft.
Space No. 6	453 ft.
Space No. 7	451 ft.
Space No. 8	462 ft.
Space No. 9	447 ft.
Total	4091 ft.

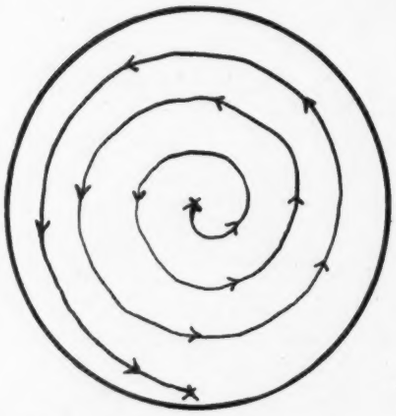
The total of 4091 divided by 9 gives us 454-5/9 average. This can be taken as the average velocity of the flue, provided there is no register face.

Another method which is frequently used by heating engineers who handle anemometers a great deal is to traverse the entire face of the register with an anemometer in such a way as to cover the register face once within the time period of the test. For this purpose a thirty seconds period is often used, multiplying the result by two to convert it into velocity feet per minute. Drawing number 3 gives an idea of this method. For a person who does not use his anemometer frequently, I believe the method as portrayed in drawing number 2 more accurate.

In case there is a register face we are up against a question on which a great many opinions have been advanced.

Some rather involved methods of arriving at the flue velocity have been presented. I have to admit that personally I have never been bothered much by register faces. In most of the ventilation jobs that I have tested, register faces have been absent. However, they are very often met with on heating jobs. One very high grade engineer after discussing various methods of offsetting register face interference ended up with the statement, "I, myself, figure a square register face as if it were round, in other words, multiply my result by 0.7854. I checked this back against the various methods based on actual tests and find it is close enough to answer my purposes."

Knowing this engineer I would say that if it was close enough for his purposes, it is close enough for most. So if you will deduct from 20 per cent to 25 per cent from your final figures on air volume on account of register faces, depending on the type of face or how much obstruction it offers, you will not go far wrong.



With a round opening the course shown here is recommended. This covers the entire opening and readings can be taken at any established interval

To complete the illustration then, our velocity for the above flue without register face is 454-5/9 feet per minute. Let us say that this flue is 24 ft. x 24 ft. It will then have four square feet of sectional area. Multiplying our velocity by four, gives us 1818-2/9 cubic feet of air per minute delivered (or withdrawn). Now supposing this flue opening is covered by a register face of an open type offering low resistance to air current, we would deduct then say 20 per cent, leaving 1454.58 cubic feet of air per minute. If on the other hand, the register face was the old cast iron type offering considerable obstruction we would deduct 25 per cent which gives us 1363.67 cubic feet per minute. I do not put this out as absolute, but simply as a convenient thumb rule which would be accurate enough for most practical purposes. It is not practical to carry the equipment nor take the trouble necessary to obtain absolute accuracy on the general run of jobs.

I am not recommending that everyone, or indeed that anyone in particular buy anemometers. They are a good thing to have if you want to know just what results you are getting in the way of air movements. They are easy to handle, they are simple to operate, they require no particular care. A reasonably good instrument can be bought for thirty-five or forty dollars.

While I am not recommending that anyone in particular buy an anemometer, I do recommend that every sheet metal contractor who is interested in either heating or ventilating shall understand anemometers, their uses and their limitations. Any contractor who does not have this understanding is likely to find himself at a serious disadvantage on occasion, particularly if he happens to be trying to sell a prospect who is interested in air volume or air velocities. It all gets back to the proposition of knowing your own line. Be an artisan rather than a mechanic and you will be happier, and possibly more prosperous.

Farm Ventilation

How many of you fellows sell ventilators to the farmers?

Or how many of you sell and install ventilators on farms?

There is a vast market there and we would like to know just how far into this field your activities extend.

If you do this kind of work, will you give us some details on number of units, how sold, how much profit, and how you cover the territory?

Zinc or Tin Can Screws

From Brouillet Sheet Metal Works, Dubuque, Iowa.

Who manufactures zinc or tin can screws?

Ans.—Berger Brothers Company, Philadelphia, Pennsylvania, whose representative in this territory is J. L. Perkins, 140 South Dearborn Street, Chicago.

Second-Hand Squaring Shears

From C. Engel & Sons, Mayville, Wisconsin.

Where can we buy a 30- or 36-inch second-hand squaring shears?

Ans.—Interstate Machinery Company, 601 West Monroe Street, and Maplewood Machinery Company, 2638 Fullerton Avenue, both of Chicago.

XXth Century Hot Blast Stove No. 26E

From S. D. Porter, Ellet, Ohio.

Will you please tell me who manufactures the XXth Century Hot Blast Heating Stove No. 26E?

Ans.—Art Stove Company, 6900 Jefferson Avenue East, Detroit, Michigan.

Repairs for "Home" Gas Stove No. 1110

From Oggier and Braun, Chicago.

Where can I secure repairs for the Home Gas Stove No. 1110?

Ans.—Northwestern Stove Repair Company, 654 West Roosevelt Road, Chicago.

Humidifier Pan for Steam Radiator

From William F. Boing, Massillon, Ohio.

Who makes a humidifier pan for a steam or hot water radiator?

Ans.—The Geo. W. Diener Mfg. Co., 400 Monticello Avenue, Chicago.

Furnace Vacuum Cleaners

From M. Levy & Co., Chicago, Illinois.

We should like to know who manufactures furnace vacuum cleaners.

Ans.—Brillion Furnace Company, Brillion, Wisconsin; The Kent Company, Inc., Rome, New York; National Super Service Company, Toledo Factories Building., Toledo, Ohio, and B. F. Sturtevant Company, Hyde Park, Boston, Massachusetts.

Screw Cap Can Spouts

From Walter H. Ziegler, Farmland, Indiana.

Where can I buy screw cap can spouts?

Ans.—Berger Brothers Company, 237 Arch Street, Philadelphia, Pennsylvania, *Chicago Agent:* J. L. Perkins, 140 South Dearborn Street, and The J. M. and L. A. Osborn Company, 1541 East 38th Street, Cleveland, Ohio.

"Hero" Furnaces

From L. Pancratz Company, Little Falls, Minnesota.

Who manufactures the "Hero" furnaces?

Ans.—Standard Foundry and Furnace Company, De Kalb.

Cast Doors for Fireplaces

From E. A. Schmidt, Wisconsin Rapids, Wisconsin.

Can you tell me who makes cast doors for fireplaces?

Ans.—Wm. H. Hoops and Company, 529 South Wabash Avenue, Chicago.

"Diamond" Furnace No. 40-20-R

From R. E. Mansfield, Warren, Ohio.

Can you tell us who the manufacturers are of the "Diamond" furnace No. 40-20-R, as we need repairs for it?

Ans.—Robinson Furnace Company, 213 West Austin Avenue, Chicago, Illinois.

Second-Hand Brake

From Jacob Brenner, Fond du Lac, Wisconsin.

Can you tell me where I can buy an 8- or 10-foot hand or power used brake to bend ¼-in. plate?

Ans.—Interstate Machinery Company, 601 West Monroe Street, Chicago.

Metal Boat Patterns

From Sheets Hardware Company, Columbia City, Indiana.

We should like to know where to secure metal boat patterns.

Ans.—H. F. Thompson Boat and Pattern Works, Decorah, Iowa.

"Osborn" Brushes

From Warner Oberly, Grand Rapids, Michigan.

Kindly advise me who manufactures the "Osborn" brushes and their address.

Ans.—Osborn Manufacturing Company, Inc., 5401 Hamilton Avenue, Cleveland, Ohio.

Controls for Furnace Fans

From Shaver-Blake Company, Cedar Rapids, Iowa.

We should like to know who manufactures controls for furnace fans.

Ans.—The Mercoid Corporation, 4201 Belmont Avenue, Chicago, Illinois; Penn Electric Switch Company, Des Moines, Iowa; Powers Regulator Company, 2720 Greenview Avenue, Chicago, and Time-O-Stat Controls Company, Elkhart, Indiana.

Chicago Distributors for "Farquhar" Furnace

From Quaker Manufacturing Company, Chicago.

Who are Chicago distributors for the "Farquhar" furnace?

Ans.—Columbia Sheet Metal Works, 5252 West Division Street.

Address of American Blower Company

From Enterprise Boiler and Tank Works, Chicago.

Where is the home office of the American Blower Company?

Ans.—6000 Russell Avenue, Detroit, Michigan.

Anemometer

From J. F. Dible, Carey, Ohio.

Can you tell me who makes an anemometer for measuring air velocities in ducts?

Ans.—E. Vernon Hill Company, 121 North Clark Street, Chicago.

"Wilder" Metal

From Myron Lehman, Elgin, Ilinois.

I am in the market for "Wilder" metal 18-gauge. Can you tell me who makes it?

Ans.—Wilder Metal Company, Niles, Ohio.

ASSOCIATION ACTIVITIES

Illinois District Meeting

The Annual Central and Southern District Meeting of the Sheet Metal Contractors Association of Illinois, was held in the rooms of the Peoria Sheet Metal Contractors Association, Peoria, Illinois, on Thursday, November 6, 1930, as reported by Chas. L. Radtke, secretary.

Peter Biegler reported that plans and arrangements for the State and National Conventions to be held in Chicago, May 13-15, 1931, are progressing well.

After an address of welcome by Vice-President Frank Eynatten, Geo. Harms was elected Toast Master of the evening. Harms called on several of the members for short talks, among those who responded were, President Jos. Walter, Vice-President Frank Eynatten, Secretary Chas. L. Radtke, Rudy Jobst, Griff George, Ralph Poe, Peter Biegler and Chas. Soedler.

The feature of the evening's program was a talk on "Better Business" by Jack Stowell.

Indiana District Meeting

The District Meeting of the Sheet Metal & Warm Air Heating Contractors' Association was held at Vincennes, Indiana, Friday, December 12. Vincennes, Terre Haute, Indianapolis, Evansville, Bedford and some other cities were represented.

Fred Bishop reported on the Columbus meeting of the National Warm Air Heating Association and George C. Joslin talked on "How to Improve the Sheet Metal Business." The spirited discussions following each talk were entered into by several members. The talks seemed to bring out the appreciation by the trade in general of the fact that the District Meetings, the Convention, the local meetings and the Association work in general have a distinctive value to the sheet metal contractor.

The meeting was opened by District Governor Wm. C. Teschner, who shortly turned it over to O. Voorhees, vice-president of the State Association, and the ranking officer present. Due to the interest displayed in certain elements of warm air heating, Mr. Bishop was prevailed upon to talk briefly on specific fan applications and it was with difficulty that the meeting was adjourned at 11 o'clock, an hour later than the appointed time.

J. M. Frank, Ilg Co., Elected President of Fan Mfrs.

J. M. Frank, president of the Ilg Electric Ventilating Co., Chicago, was elected president of the National Association of Fan Manufacturers, which comprises more than 80% of the ventilating fan and blower industry, at their annual meeting in the Hotel Roosevelt at New York recently.

Other officers were elected for 1931 as follows: R. E. Shaw, general sales manager of the B. F. Sturtevant Co., Boston, vice-president, and E. B. Cresap of Chicago, secretary. The latter is the professional secretary of the association.

Old Westerners Organize Western Hot Air Club

At the recent meeting of the National Warm Air Heating Association, John Fehlig and Herb Symonds were weeping on each other's necks because "there isn't any more fun at the conventions since the Western Warm Air joined the National."

So some of the fellows put their heads together and sent out an S. O .S. for a meeting of all the Western members and a new organization was formed—strictly for social purposes—The Western Hot Air Club. The only qualifications for membership are: You must have belonged to the old Western Warm Air Furnace and Supply Association, be a good fellow and have $2 to pay the annual membership fee.

Permanent officers were elected as follows: President, Herb Symonds; first, second and third vice-presidents, George Harms; secretary-treasurer, John Fehlig; sergeant-at-arms, Earl Nesbit; entertainment committee chairman, Harvey Manny—all officers to serve for life and ten years thereafter.

In addition to all the newly elected officers, the following attended the meeting: Blair Quick, Ernie Fox, Bob Badeau, Charlie Forshew, Ed Seith, Lee Colburn and Ed Carter.

All the members of the old association will receive a formal invitation to join.

Etta Cohn was elected honorary member with all the privileges except the payment of dues, she to have the honor of resuming her old practice of donating a box of cigars at all meetings.

Meetings will be held twice per year, the next gathering to be held in Chicago on May 11.

Chicago Sheet Metal Employers Elect Officers

At the annual meeting of the Associated Sheet Metal Employers of Chicago, held December 3, 1930, the following members were elected to serve in their respective office for the ensuing year: George H. Krutzkoff, president; Fred S. Bremer, vice-president; Peter J. Wagner, treasurer; George C. Clark, secretary.

Sheet Metal and Warm Air Heating Contractors' Association of Indiana—January 20, 21, 22, 1931, at Ft. Wayne, Indiana. Paul R. Jordan, Executive Secretary, 631 South Delaware Street, Indianapolis, Indiana.

Sheet Metal Contractors' Association of Wisconsin — February 2-3, 1931, at Milwaukee, Wisconsin. Paul L. Biersach, Secretary, 853 Grant Boulevard, Milwaukee, Wisconsin.

February, 1931—Ohio Sheet Metal Contractors' Association, Columbus, Ohio.

Sheet Metal Contractors' Association of Pennsylvania—March 9, 10, 11, 1931, at Hendler Hotel, Johnstown, Pennsylvania. M. F. Liebermann, Secretary, 1411 Merchant Street, Ambridge, Pennsylvania.

Sheet Metal Contractors' Association of Florida—March 30-31, 1931, at Miami, Florida. G. H. Leavitt, Secretary-Treasurer, 909 Main Street, Tampa, Florida.

Joint Convention Sheet Metal Contractors' Association of Illinois and National Association Sheet Metal Contractors—May 12-15, 1931, at Chicago, Illinois. A. B. Rysdon, Secretary, Associated Sheet Metal Employers of Chicago, 350 North Clark Street, Chicago, Illinois.

January 26-29, 1931—American Society of Heating and Ventilating Engineers 37th Annual Meeting, Pittsburgh, Pa.

NEW ITEMS *and* NEWS ITEMS
From and about the Manufacturers and Jobbers

Satin Finish Nickeloid and Chromoloid Metals Perfected

The American Nickeloid Co., Peru, Ill., have developed what is said to be a true Satin Finish in both Nickeloid (Nickel Zinc) and Chromaloid (Chrome Zinc) which has recently been announced.

In order to meet the existing demand for such a finish, for the past year their engineers have been working on the problem.

There are several very definite advantages claimed for Satin Finish over a bright polish. For instance, a Satin Finish can be formed and bent without distorting the surface. This has been one of the objections in working in a highly polished sheet metal. Another advantage in Satin Finish is that scratches and abrasions occurring in handling the metal do not show up as on a highly polished surface. The manufacturer claims that Satin Finish metals are very durable and will really withstand the wear and tear of everyday use.

Satin Finish can be furnished in a full range of sizes, gauges and tempers, and the American Nickeloid Co. will welcome requests for more detailed information and samples.

Brownell Co. Will Send Book Describing Stoker

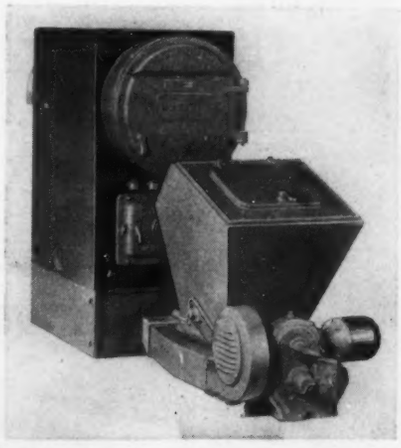
The Brownell Co., Dayton, Ohio, has just released Bulletin IH-10 describing the Brownell "Ideal Home" Stoker for use in domestic installations with bituminous coal.

The Brownell Company has for a number of years manufactured a Heavy Duty Ram Type Underfeed Stoker for larger power boilers, a smaller industrial and light commercial screw type Underfeed Stoker, and now after nearly two years of experimentation and research has placed a domestic unit on the market.

The unit is exceptionally sturdy, added extra thickness and weight has been provided at points where these two things are factors, the same precision of workmanship contained in this as in the larger Brownell Stokers.

The Ideal Home Stoker is equipped with a device actuated by the temperature of the gas within the furnace or boiler which in turn is dependent upon the amount of fire in the firebox for maintaining a small bed of live coals indefinitely through periods of mild firing weather. Nothing is set in advance to arbitrarily predetermine what length of time the stoker should operate to accomplish this important function.

The Ideal Home Stoker is equipped with an Automatic Draft Cut-off, which is mechanical and not electrical in its operation. The fan is fitted with an inlet ring and silencer, which makes it practically noiseless. The gear case is of the continuous drive principle, the



motor being mounted with a special bell and casting, direct drive. The bearings are bronze. The gears are all drop forged and operate in oil bath. The retort, self-contained wind box and clean out are all cast in one piece. The hopper is of Armco Ingot rust-resisting iron and holds an unusually liberal quantity of coal, the capacity being 325 lbs. The shipping weight of the unit is approximately 750 lbs.

Van Dyke of Ryerson Lectures on Special Steels

G. Van Dyke, Manager of the Special Steels Department of Joseph T. Ryerson & Son, has been delivering at various points throughout the country, lectures on alloy steels, tool steels, and stainless steels. Recent meetings have been held in Minneapolis, Cincinnati and Milwaukee where he addressed about two hundred engineers and shop men on each occasion. The lectures usually cover the better part of a day.

The talk and demonstration which was originally prepared for Ryerson salesmen and service men covered two days, but has now been boiled down to about three hours on the lecture and two hours on practical demonstration and instruction including welding. The first gives a general background of the stainless steel alloys and classification of the various analyses, such as high carbon stainless steel, low carbon stainless iron, high chrome stainless iron, chrome nickel stainless iron of the 18-8 type and chrome nickel alloys of the heat resisting type. The various characteristics of these different products are discussed such as corrosion resistance, machinability, formability, weldability, resistance to scaling, etc.

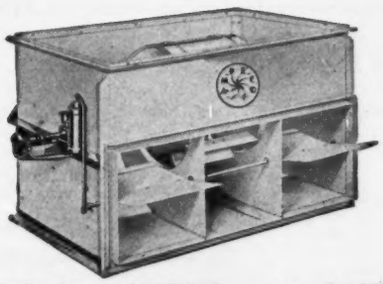
The fabrication of the 18-8 type is covered in considerable detail, including its general application to various industries. A display of samples is shown, including white pickled and polished sheets, cold rolled strips, screws, nuts, wire, samples of deep drawing, polishing, etching, welding, cooking utensils, etc. Another important feature covered in the lecture is the use of high temperature resisting alloys at elevated temperatures both in regard to physical properties, resistance to oxidation or scaling, and creep values. Time is also given to alloy steels and tool steels.

The entire lecture and demonstration is of a strictly non-technical character and is given in such a way as to be clearly understandable by superintendents, shop foremen, welders and others who may or may not have had technical training. All charts and tables used in the lecture are reproduced in mimeograph form and are supplied to all those attending the lecture.

Kester Broadside Features National Advertising

The Kester Solder Co., 4201 Wrightwood Ave., Chicago, Ill., has recently issued an impressive broadside featuring the advertising which this company is doing in some 56 national magazines and industrial publications featuring the many uses of their product, Kester Flux Core Solder.

The appeal of this advertisement is to dealers, who are urged to cash in on the increasing use of this type of solder in the home as well as to the industrial users of solder.



The ACE of All Forced Air Circulators

for Your Heating Jobs

AM-PE'-CO has revolutionized air circulator construction and efficiency. The only blower that positively provides a fully balanced distribution of air to the rotor—vital to proper blower operation. Patented improvements assure positive, uniform heat delivery. Mechanically controlled; compact; quiet; non-leaking ring oil bearings. A big business builder and profit maker for the dealer.

Built with or without dampers which open automatically when the blowers stop, for gravity circulation. Get more blower business for yourself—write us for literature on Am-pe'-co Blowers, and full information.

AMERICAN MACHINE PRODUCTS COMPANY
Marshalltown, Iowa
For 15 Years Manufacturers of Precision Products

AM-PE'-CO BLOWER

A-C *Thermostatically Controlled* *Automatic* **HEAT BOOSTER**

Easy to Sell Easy to Install

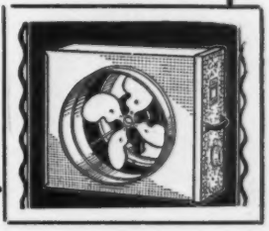
THE A-C Automatic Heat Booster is easy to sell because it provides an efficient air mover at a moderate price. Its compact housing makes it easy to install in any furnace with very little experience.

Displayed in your window or carried to the prospect's door, this fan will literally sell itself and lead you to many a profitable job.

The A-C line now includes a range of sizes from 9 inches to 36 inches. For large jobs requiring greater capacities, two A-C Boosters can be used with one Mercury Control. An A-C Booster will positively increase the efficiency of any warm air furnace, providing greater comfort at reduced fuel cost.

Write today for complete details and prices

A-C MFG. CO.
417 Sherman Street
Pontiac Illinois



DO YOU KNOW THESE FACTS ABOUT The HOME

1—THAT the Home Furnace has a ONE-PIECE RADIATOR with no joint for cleanout or smoke collar inside of casing; thus another set of joints is eliminated.

2—THAT the Home Furnace builds a rotary circuit grate with a MACHINED SHAKER SHAFT, insuring ease of operation and the elimination of dust in the basement.

3—THAT the Home Furnace uses the HEAVIEST firepot with a smooth casting, the lightest being 1 1/16" in thickness.

4—THAT the Home Furnace uses a SEALED-TYPE joint which does not permit cement to loosen or fall out.

5—THAT the Home Furnace, in addition to its regular standard, illustrated on this page, builds a HOT BLAST that guarantees a saving of from 15% to 30% in fuel.

6—THAT the Home Furnace with all these features sells at a PRICE that will place you ahead of competition.

Mr. Dealer, would these advantages help you in your 1931 program? We will gladly explain.

HOME FURNACE CO.
HOLLAND, MICH.

HOME FURNACE COMPANY, Holland, Michigan.
Send me full details regarding your 1931 plan:

Name.....

Address..... City..... State.....

~ MARKET QUOTATIONS ~

AMERICAN ARTISAN is the only publication quoting Prices on Metals, Sheet Metal Equipment and Supplies, Warm Air Heating Supplies and Accessories, corrected bi-weekly. These quotations are not guaranteed but are obtained from reliable sources and reflect nation-wide market conditions at the time of going to press.

NOTE—These prices are Chicago Warehouse Prices to which must be added territory differentials

METALS

PIG IRON

Chicago Fdy., No. 2	$17.50
Southern Fdy. No. 2	$16.51 to 17.01
Lake Superior Charcoal	27.04
Malleable	17.50

FIRST QUALITY BRIGHT CHARCOAL TIN PLATES

IC	20x28	112 sheets	$22.50
IX	20x28		25.50
IXX	20x28	56 sheets	14.50
IXXX	20x28		15.50
IXXXX	20x28		17.00

TERNE PLATES

	Per Box
IC 20x28, 40-lb. 112 sheets	$24.00
IX 20x28, 40-lb. 112 sheets	26.50
IC 20x28, 25-lb. 112 sheets	20.50
IX 20x28, 25-lb. 112 sheets	23.50
IC 20x28, 20-lb. 112 sheets	19.00
IV 20x28, 20-lb. 112 sheets	22.00

"ARMCO" INGOT IRON PLATES

No. 8 ga.—110 lbs.	$4.15
3/16 in.—100 lbs.	4.05
¼ in.—100 lbs.	3.85

COKE PLATES

Cokes, 80 lbs., base, 20x28	$12.00
Cokes, 90 lbs., base, 20x28	12.20
Cokes, 100 lbs., base, 20x28	13.75
Cokes, 107 lbs., base, IC, 20x28	12.75
Cokes, 135 lbs., base, IX, 20x28	14.75
Cokes, 155 lbs., base, 2X, 56 sheets	8.50
Cokes, 175 lbs., base, 3X, 56 sheets	9.35
Cokes, 195 lbs., base, 4X, 56 sheets	10.25

BLUE ANNEALED SHEETS

Base 10 ga. per 100 lbs.	$3.35
"Armco" 10 ga. per 100 lbs.	4.15

ONE PASS COLD ROLLED BLACK

No. 18-20 per 100 lbs.	$3.75
No. 22 per 100 lbs.	3.70
No. 24 per 100 lbs.	3.75
No. 26 per 100 lbs.	3.85
No. 27 per 100 lbs.	3.90
No. 28 per 100 lbs.	4.00

GALVANIZED

No. 16 per 100 lbs.	$3.85
No. 18 per 100 lbs.	3.95
No. 20 per 100 lbs.	4.15
No. 22 per 100 lbs.	4.20
(Standard differentials on extras to apply)	
No. 24 per 100 lbs.	$4.35
No. 26 per 100 lbs.	4.60
No. 27 per 100 lbs.	4.70
No. 28 per 100 lbs.	4.85
"Armco" 24 per 100 lbs.	5.95

BAR SOLDER

Warranted 50-50 per 100 lbs.	$18.00
45-55 per 100 lbs.	17.00
48-52 per 100 lbs.	17.75
Plumbers' per 100 lbs.	15.50

ZINC

In Slabs	$5.00

SHEET ZINC

Cask Lots (600 lbs.)	$12.00
Sheet Lots (100 lbs.)	13.00

BRASS

Sheets, Chicago base	17⅞c
Tubing, brazed, Chicago base	25⅝c
Tubing, seamless, Chicago base	22⅝c
Wire, Chicago base	18⅛c
Rods, Chicago base	16⅛c

COPPER

Sheets, Chicago base	20⅝c
Tubing, seamless, Chicago base	23⅛c
Wire, plain rd., 8 B. & S. Ga. and heavier	13⅛c

LEAD

American Pig	$6.00
Bar	7.50

TIN

Bar Tin per 100 lbs.	$32.00
Pig Tin per 100 lbs.	31.00

SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES

ASBESTOS

Paper up to 1/16	5c per lb.
Roll board	6c per lb.
Mill board 3/32 to ⅛	6c per lb.
Corrugated paper (250 sq. ft. per roll)	$5.00 per roll

ASBESTOS SEGMENTS

8 in. per 25 sets	$1.85
9 in. per 25 sets	2.10
10 in. per 25 sets	2.35
12 in. per 25 sets	2.65

CEMENT FURNACE

5-lb. cans, net	$0.40
10-lb. cans, net	0.80
25-lb. cans, net	2.00
Per 100 lbs.	7.50

CLIPS

Damper

No-Rivet Steel, with tail pieces, per gross	$9.50
Rivet Steel, with tail pieces, per gross	7.50
Tail pieces, per gross	2.40

COPPER FOOTING

Copper Footing	41%

CORNICE BRAKES

Chicago Steel Bending

Nos. 1 to 6B	Net

CUT-OFFS

Cal., plain, round or cor. rd.

26 gauge	30%
28 gauge	35%

DAMPERS

Yankee Warm Air

7 inch, doz.	$1.60
8 inch, doz.	2.20
9 inch, doz.	2.60
10 inch, doz.	2.80
12 inch, doz.	3.50
14 inch, doz.	5.00

EAVES TROUGH

Galv. Crimpedge, crated	75-15%
Zinc	60%

ELBOWS

Conductor Pipe

Galv. plain or corrugated, round flat Crimp.

28 gauge	60-10%
26 gauge	50%
24 gauge	15%

Galv. Terne Steel

Plain Rd. and Rd. Corr.

28 gauge	60-10%
26 gauge	50%
24 gauge	15%

Square Corrugated

28 gauge	55%
26 gauge	40%

Portico Elbows

Standard Gauge Conductor Pipe, plain or corrugated.

Not nested	70 & 5%
Nested solid	70 & 5%

Sq. Corr., A. & B. & Octagon

28 gauge	55%
26 gauge	40%

Portico

1, 1½, 1½ inch	45%

Copper

16 oz. all designs	50%

Zinc

All styles	60%

ELBOWS—Stove Pipe

1-piece Corrugated, Uniform Blue

No. 28 Gauge.	Doz.
5 inch	$1.15
6 inch	1.25
7 inch	1.75

Adjustable—Uniform Blue

No. 28 Gauge, Uniform Blue.

5 inch	$1.60
6 inch	1.75
7 inch	2.10

WOOD FACES—60% off list.

FIRE POTS

	Each
No. 02 Gasoline Torch, 1 qt.	$5.13
No. 9250, Kerosene, or Gasoline Torch, 1 qt.	6.50
No. 10 Tinner's Furnace Square tank, 1 gal.	11.20
No. 15 Tinner's Furnace Round tank, 1 gal.	10.70
No. 21 Gas Soldering Furnace	8.00
No. 110 Automatic Gas Soldering Furnace	10.50

GLASS

Single and Double Strength, A, all brackets	85%
Single and Double Strength, B, all brackets	87%

HANGERS

Conductor Pipe

Milcor Perfection Wire	25%
Milcor Triplex Wire	10%

Eaves Trough

Steel (galv. after forming) from list	45%
Selflock E. T. Wire, List	10%

HOOKS

Conductor

"Direct Drive" Wrought Iron for wood or brick	15%

MITRES

Galvanized Steel Mitres

28 gauge	70
26 gauge	60-20

PASTE

Asbestos Dry Paste

200-lb. barrel	$15.00
100-lb. barrel	7.75
50-lb. pail	4.50
25-lb. pail	2.50
10-lb. bag	1.20
5-lb. bag	0.60

PIPE

Galvanized

Crated and nested (all gauges)	75-12½%
Crated and not nested (all gauges)	75-7½%

Furnace Pipe

Double Wall Pipe and Fittings	60%
Single Wall Pipe, Round Galvanized Pipe	60%
Galvanized and Tin Fittings	60%

Lead

Per 100 lbs.	$12.50

Stove Pipe

"Milcor" "Titelock" Uniform Blue Stove

28 gauge, 5 inch U. C. nested	$10.00
28 gauge, 6 inch U. C. nested	11.00
28 gauge, 7 inch U. C. nested	13.00
30 gauge, 5 inch U. C. nested	9.25
30 gauge, 6 inch U. C. nested	10.00
30 gauge, 7 inch U. C. nested	12.00

T-Joint Made Up

6 inch, 28 ga. per doz.	$3.40

REGISTERS AND FACES

Floor Registers

Except Cast Iron	40 & 10%
Cast Iron	20%

Baseboard

2-Piece	40 & 10%
1-Piece	40-10 & 20%

Adjustable Ventilators

Adjustable Cold Air Faces	40 & 10%
Adjustable Ventilators	40 & 10%

RIDGE ROLL

Galv. Plain Ridge Roll, b'dld	75-15-5%
Galv., Plain Ridge Roll, crated	75-15%

SCREWS

Sheet Metal

7, ¼x⅛, per gross	$0.52
No. 10, ¾x3/16, per gross	0.65
No. 14, ⅞x¼, per gross	0.85

SHEARS, TINNERS' AND MACHINISTS'

Viking	$22.00

Lennox Throatless

No. 18	35%
Shear blades (f. o. b. Marshalltown, Iowa.)	10%

SHOES

Galv. 28 Gauge, Plain or Corrugated, round flat crimp	60%
26 gauge, round flat crimp	50%
24 gauge, round flat crimp	15%

SNIPS

Tinners'	Net

VENTILATORS

Standard	30 to 40%
Milcor	Net

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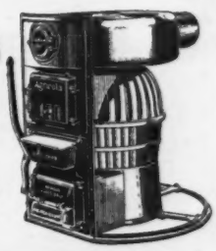

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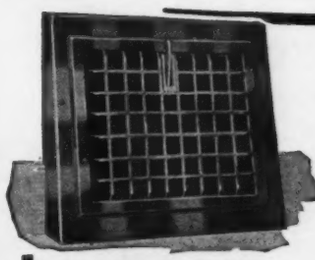

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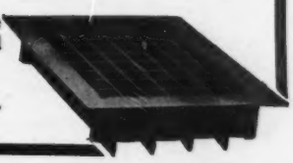

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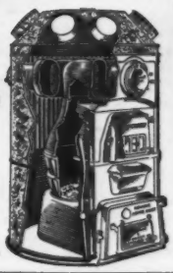

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National Super Service Co., Toledo, Ohio

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Chase Brass & Copper Co., Waterbury, Conn.
Revere Copper & Brass, Rome, N. Y.
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(Continued on page 54)

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(Continued from page 52)

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Meyer & Bro. Co., F., Peoria, Ill.
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Lastik Products Corp., Pittsburgh, Pa.

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Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
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St. Louis Technical Institute, St. Louis, Mo.

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Parker-Kalon Corp., 200 Varick St., New York

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Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Parker-Kalon Corp., 200 Varick St., New York

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Harrington & King Perforating Co., Chicago, Ill.

Scuppers

Aeolus Dickinson Chicago, Ill.

Shears—Hand and Power

Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
The Stanley Electric Tool Co., New Britain, Conn.
Viking Shear Co., Erie, Pa.
Yoder Co., The, Cleveland, O.

Sheet Metal Screws—Hardened, Self-Tapping

Parker-Kalon Corp., 200 Varick St., New York

Sheets—Alloy

International Nickel Co., New York, N. Y.
Republic Steel Corp., Youngstown, Ohio

Sheets—Black and Galvanized

American Rolling Mill Co., Middletown, Ohio
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
Taylor Co., N. & G., Philadelphia, Pa.

Sheets—Iron

American Rolling Mill Co., Middletown, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Republic Steel Corp., Youngstown, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Sheets—Tin

Taylor Co., N. & G., Philadelphia, Pa.

Shingles and Tiles—Metal

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Sifters—Ash

Diener Mfg. Co., G. W., Chicago, Ill.

Sky Lights

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Snips

Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Solder—Acid Core

Kester Solder Co., Chicago, Ill.

Solder—Self-Fluxing

Kester Solder Co., Chicago, Ill.

Solder—Rosin Core

Kester Solder Co., Chicago, Ill.

Solder

Kester Solder Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Soldering Coppers

Revere Copper & Brass, Rome, N. Y.

Soldering Furnaces

Diener Mfg. Co., G. W., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Specialties—Hardware

Diener Mfg. Co., G. W., Chicago, Ill.

Stars—Hard Iron Cleaning

Fanner Mfg. Co., Cleveland, Ohio

Tinplate

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Taylor Co., N. & G., Philadelphia, Pa.

Tools—Tinsmith's

Bertsch & Co., Cambridge City, Ind.
Dries & Krump Mfg. Co., Chicago, Ill.
Hyro Mfg. Co., New York, N. Y.
Interstate Machinery Co., Chicago, Ill.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peck, Stow & Wilcox Co., Southington, Conn.
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
The Stanley Electric Too. Co., New Britain, Conn.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.

Torches

Diener Mfg. Co., G. W., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Trade Extension

Copper & Brass Research Association
National Association of Flat Rolled Steel Manufacturers, Cleveland, Ohio

Trimmings—Stove and Furnace

Fanner Mfg. Co., Cleveland, Ohio

Vacuum Cleaner—Furnace

Brillion Furnace Co., Brillion, Wis.
National Super Service Co., Toledo, Ohio

Ventilators—Floor

Aeolus Dickinson Chicago, Ill.

Ventilators—Roof

Aeolus Dickinson Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Paul R. Jordan & Co., Indianapolis, Ind.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Ventilators—Ceiling

Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co., Cleveland, Ohio

Wood Faces—Warm Air

Auer Register Co., Cleveland, Ohio
American Wood Register Co., Plymouth, Ind.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Say you saw it in AMERICAN ARTISAN—Thank you!

Alphabetical List of Advertisers

Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in alternate issues is marked with an asterisk.

THE BUYERS' DIRECTORY APPEARS ON PAGES 52 AND 54

WANTS AND SALES

Yearly subscribers to the AMERICAN ARTISAN may insert advertisements of not more than fifty words in our Want and Sales Columns WITHOUT CHARGE for three insertions.

Such advertisements, however, must be limited to help or situation wanted, tools or equipment for sale, to exchange or to buy, business for sale or location desired, and must reach our office ten days prior to date of publication. This privilege is not extended to manufacturers or jobbers—or those making a business of buying and selling used machines—employment agencies and brokers.

When sending advertisement state whether your name or blind number is to be used.

SITUATION WANTED

Situation Wanted—Want work as plumber and sheet metal worker in shop with Hardware store. Have had experience as clerk in store; can lay out own patterns and work them. Have small family and want steady year 'round job. Twenty-five dollars per week to start if employed by January 1st. Would consider buying good going shop on payment plan. Address E-530. AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—By man 38 years of age. Eighteen years experience in all branches of warm air heating. Thoroughly understands forced, booster and gravity systems; can do own layout and drafting. Position wanted as salesman for a reliable furnace manufacturer or salesman and engineer for a dealer. Best of references furnished. Address X-529, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—After January first, will be open for position. Have had twenty years of experience in sales, sales managing and handling of canvassers. Can take full charge of furnace installations and laying out plans. Can furnish surety or cash bond if required. Best of References. Address AMERICAN ARTISAN, 139 N. Clark Street, Chicago, Illinois, Box D-530.

Situation Wanted—By sheet metal worker with twenty years experience in contract shop. Would like to connect with shop wanting steady man who can do the work. Will come on thirty days trial. South Iowa, Illinois, Missouri or Kansas. Address K-530, AMERICAN ARTISAN.

Situation Wanted—First Class Licensed Plumber, sheet metal worker and heating man, steady, sober, and competent in all branches of the trade, would like steady position; or will take shop on commission. Address Arthur Greeter, Lake Geneva, Wisconsin. Z-529

Situation Wanted—By First Class radiator repair man. Can recore and rebuild all makes from a Ford to an airplane. Can also do furnace work. Address L-530, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

SITUATION WANTED

Situation Wanted—Have traveled Michigan and Indiana eight years selling high grade boilers, cast and steel furnaces and accessories. Can figure plans. Have a large acquaintance throughout this territory. Am married, own car, and can furnish references. Address Travers Daniel, Jr., 817 Merritt St., S.E., Grand Rapids, Mich. F-530

Situation Wanted—By a first class sheet metal worker and furnace man. Not a floater—steady and reliable. Will work for board and transportation until March 1st. Address Y-529, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—Tinner wants job. Twelve years experience; 34 years old; can do furnace work and radiator repairing; good reliable worker. Will go anywhere. State wages in first letter. Address M-530, AMERICAN ARTISAN. 139 N. Clark St., Chicago, Ill.

Situation Wanted—Modern Warm Air Heating Expert can qualify for any position with large heating firm. Expert in building trade and as high class factory representative. Address O-530. AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—Have had 15 years Warm Air Heating experience. Familiar with every detail of residence, school, church or industrial heating. Would prefer the southeast, either in office of manufacturer or as district representative of national organization. Address A-531, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—Connection with a high grade furnace manufacturer as salesman, wanted. Illinois, Indiana, or Iowa preferred. Have had twenty years experience. Address B-531. AMERICAN ARTISAN, 139 N. Clark St., Chicago, Illinois.

Situation Wanted—Would like to get in touch with parties interested in employing a salesman for gas fired warm air furnaces (Traveling for manufacturers). Have had seven years experience in gas furnace heating including estimating full costs, installations in both gravity and forced air heating. Have sold and supervised installations of approximately 600 jobs in this territory. Can give best of references. Address C-531, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

BUSINESS CHANCES

For Sale—Shop and business established over fifty years; good location; general sheet metal work, heating, and ventilating. Good furnace business. Only one competitor. Good opportunity. Selling on account of death of partner and old age. Will bear close inspection. Address T-530. AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Wanted—Location for Tin and Furnace business. Would buy going business if it can show business is to be had. Would run shop in connection with Hardware store for owner or as my own if space can be had and future prospects encouraging. Address Y-530. AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

For Sale—Shop that has been established 40 years; town of about 12,000; first class work only produced in warm air heating, sheet metal roofing, and ventilating. Only 3 other shops in town. Address Mr. Clyde M. Howell. 208 W. Third St., Greensburg, Pa. T-529

For Sale—Tin Shop with living quarters. Well established and well equipped. Located in a live oil town. Buildings and stock will run about $3000. Some terms to reliable party. Address J. P. Monday, Box 751, Hobbs, New Mexico. W-529

For Sale—Bargain. 90 foot front by 113 foot depth. Located 90 feet east of Lewis and Clark bridge. Want to retire from business is the reason for selling. Address Chris Eckhard, Eckhard Mercantile Co., 512 E. Broadway, Alton, Illinois. X-530

For Rent—Hardware store with fixtures. Splendid farming community in northwestern Illinois. Address W-530, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

TOOLS AND MACHINES

For Sale—Number 125 Fuller Rapid slitting shears, capacity 10 gauge. Will cut outside and inside circles from 5 to 48 inches. Will also slit straight sheets. This machine is in good working order and belt driven. Cash price, $175.00 F.O.B. Kalamazoo. Address Knapper Sheet Metal Co., 216 East Walnut Street, Kalamazoo, Michigan. P-530

For Sale—A 72" Box and Pan Brake used only a few weeks. This machine will handle 16 gauge material and weighs around 2000 lbs. Also mounted on heavy casters. Price, $150.00. Address Chas. Barnum, Mankato, Minnesota. E-531

For Sale—Type "T" 9 Summerheat Oil Burner, thermostat and Relay. Used two months. Best offer takes it. Address C. L. Epps, 229 North Washington St., Van Wert, Ohio. R-530

For Sale—A Gottschalk "Christie" Furnace Cleaner—like new. Only used on one job. Will sell at great sacrifice. Address Jos. Koubek & Son, 5234 West 22nd Street, Cicero, Illinois. S-530

For Sale—No. 2 Ryerson Lennox Shear, belt drive. Will handle 10 gauge material and will cut circles or straight. Price, $100.00. Address Chas. Barnum, Mankato, Minnesota. D-531

For Sale—Used tinners bench machines including 30" shear, role and folders; also plumbing tools. Address F-531, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

WANTED

Used 10 foot square shears up to 3/16" capacity, 10 foot slip end rolls to 3/16" capacity, 10 foot brake 14 or 16 gauge and lighter. Must be in good condition and a bargain. Address Z-530, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Illinois.

Wanted—An eight or ten foot hand or power used brake to bend 1/4" plate. Address Jacob Brenner, 45-47 Third Street, Fond du Lac, Wisconsin. C-530

Wanted—One 8' Cornice brake 14 or 18 Ga and lighter. Address J. R. Wright, Audobon, Iowa. R-529

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Capable experienced retail furnace salesman by distributor in Chattanooga, Tennessee, for a popular priced line of both steel and cast iron furnaces. This salesman will be made Manager of this department, having charge of furnace sales, repair work, and cleaning furnaces and boilers by vacuum. Territory will consist of some 20 counties with Chattanooga as center. Must be able to lay out jobs, prepare working sketches and give general supervision to installations. Excellent opportunity for right man. Give full information in reply, together with a list of references. Address H-530, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Manufacturers Agents

Wanted to sell our furnace cement, roofing paint and cement and calking compound. Our consistent trade paper advertising is creating demand. Exclusive territory given with liberal commission. Address B-530, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

BOOKS

The Revised Edition of the New Metal Worker Pattern Book by Kittridge and Associates is one book that should be in every shop. As a reference book alone it is indispensible. Over 500 9x11-inch pages with 895 illustrations. It covers the principles underlying practically every problem that is likely to come up in daily practice. Beginning with the selection and use of drawing tools, the author explains linear and geometrical drawing so clearly that one who has had nop revious knowledge of arithmetic or drawing may understand these essentials and apply them. The most approved methods of pattern cutting are also given in the course of the work... Price, $6.00, postpaid. Order from the Book Dept., AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Standard Practice in Sheet Metal Work is the name of the big book written, compiled and published by the National Sheet Metal Contractors Association. It took years of hard, careful planning and work to produce this book. No other book like it—it describes and illustrates the standard method of designing, working and installing and erection of all forms of sheet metal work. Gutter construction of all kinds is shown in detail. Blow pipe work, skylight, roofing, cornice, ventilating, warm air heating, etc. It's the best $10.00 book investment you can make. No matter what other books you have you need this book. Order from the Book Dept., AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Manual of Automotive Radiator Construction and Repair, by F. L. Curfman and T. H. Leet —Anyone interested in Radiator Repairing will find the 185 pages of practical instructions and 120 illustrations showing actual construction and repairing a big help. In a condensed manner some four to five thousand answers to questions are given. It is thoroughly practical, as both authors are men of wide experience in this work. Printed in large, easy to read type. Measures 5¾x9 inches. Price $2.50. Order from Book Department, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

BOOKS

Here are the two books that most sheet metal workers and contractors classify as the most complete books on Sheet Metal Pattern Cutting. The Universal Sheet Metal Pattern Cutter, Vol. 1, deals with every phase of inside work, including Heating, Ventilating, Blower and Exhaust Piping Connections, Marine Sheet Metal Work, Automobile Sheet Metal Work, Machinery and Belt Guards, etc., Mensuration applied to Sheet Metal Work, etc., with many features of construction and Labor-Saving Methods are also given in detail.

Vol. 2 deals with every form of Outside and Architectural Sheet Metal Work. A treatise on Drawing, Full Size Detailing and Lettering, Construction of Cornices, Skylights, Molding, Copings, Electrically Illuminated Signs, etc.

Cloth bound, 400 pages each volume. Price, $7.50 per volume, postpaid. Order from Book Department. AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

You Can Buy Overton's Simplified Engineering Plans

The articles and stories by Platte Overton, which have proved so interesting, are all based upon a plan of Simplified Engineering. This plan is sold in the form of large blueprints. Each print shows complete plans, data sheet, construction details, etc.

If you would like to know more about this service, write AMERICAN ARTISAN or Platte Overton, care of this magazine.

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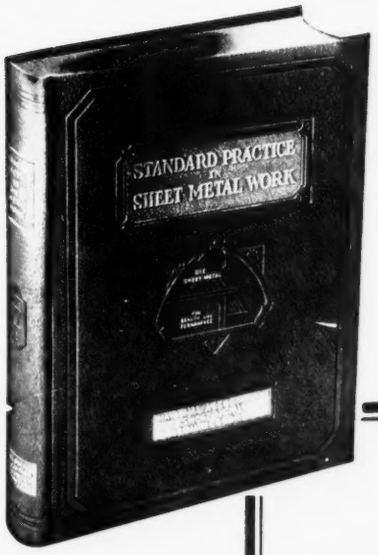

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from You to Yourself —an excellent Book to give Architects

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IT covers every branch of the sheet metal industry including warm air furnace heating.

It illustrates and describes the Standard Practice of constructing and installing *all* sheet metal work.

It is the only authority on Standard Practice to which you can refer for reliable data.

It will earn its cost the first day you have it in your shop.

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Get your copy now and you'll see why it will pay you to present a copy to at least one architect in your town. With this book in his office the architect has a RELIABLE, AUTHORITATIVE source of reference to aid him in specifying sheet metal work.

ARCHITECTS CAN'T SPECIFY WORK THEY DON'T KNOW ANYTHING ABOUT—THIS BOOK TELLS THEM AND SHOWS THEM HOW TO SPECIFY QUALITY SHEET METAL WORK OF EVERY NATURE.

The book contains 768 9x12 pages—494 pages of illustrations and 274 pages of text.

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Above: Plain "Twodrain" Roofing.
Below: Corrugated Sheets and Self Cap Roll Roofing.

Above: Ornamental "Twodrain" Roofing.
Below: Milcor Metal Spanish and American Tile.

THE *Milcor* line of metal roofing material represents the finest standard of quality and manufacture. In addition to the more common forms of materials such as Corrugated Sheets . . Self Cap Roll Roofing . . Standing Seam Roofing and many others, *Milcor* offers two outstanding favorites in "Twodrain" Channel Roofing and *Milcor* Metal tile.

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MILCOR STEEL COMPANY (formerly Milwaukee Corrugating Co., Milwaukee, Wisconsin and The Eller Mfg. Co., Canton, Ohio)

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Milwaukee, Wis. Canton, Ohio Chicago, Ill. Kansas City, Mo. La Crosse, Wis.

Sales Offices: New York, 418 Pershing Square Building; Boston, Mass., 726 Little Building; Atlanta, Ga., Bona Allen Building; Minneapolis, Minn., 642 Builders Exchange Building; Little Rock, Ark., 501 W. Markham Street

MILCOR PRODUCTS